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How to do More with Your Bench Grinder

ShopNotes®

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EDITOR'S NOTE

Cutoffs

A dado. One of the most basic woodworking joints. It's really nothing more than a channel cut into a workpiece that another piece fits into. Sounds easy enough. But once you actually try cutting one you realize there's a bit more to it.

For one thing, the width of the dado needs to be sized correctly. It has to match the thickness of the piece that fits into it — exactly.

Now, there are several methods to make a dado. One common way is to use the table saw and a dado set. But getting the correct width can take quite a bit of fussing. You'll probably have to use shims and make several test cuts.

Is there a better solution? Well, if you're looking for a fast and accurate way to cut dadoes, all you need is a router — and our new dado jig.

This jig can easily be adjusted to cut any size dado from $1/2$" to $1\,1/2$". You can "lock-in" the size of the dado with just one setup. And it's guaranteed to fit — every time.

But what really sets this jig apart is a built-in, quick-release clamp that locks it to the workpiece with just a turn of a knob. Now you don't have to fiddle with a bunch of clamps every time you cut a new dado.

All in all, it's a jig that's bound to see lots of use in your shop. To learn more, check out the article on page 6.

More Projects – We also have a couple of other projects that will transform everyday tools into high-performance machines. For starters, there's the band saw table and fence. It's designed to give you more of what you need — a bigger worksurface and a better fence.

If you've ever had trouble trying to sharpen a tool with a bench grinder, you'll want to check out our bench grinder sharpening system on page 24. It will turn any grinder into a precision sharpening machine.

New Face – Recently, we've added another person to our staff. Ron Johnson has joined us as an assistant editor.

Terry

Be included, as a part of the
Woodworking Shop Tours

On the Web

Visit other *ShopNotes* subscribers' workshops and see photos of the shop projects they've built. It's all online at Woodworking Shop Tours on the *ShopNotes* web site:

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We want you to be part of our shop tours! To submit photos of your favorite *ShopNotes* projects or views of your shop, just follow the instructions you'll find on our web site.

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With this shop-made jig, you'll be routing dadoes and grooves that fit perfectly. Plus, this router jig features a built-in clamp that makes setup a snap.

Band Saw Tune-Up ____ 12

Think a band saw is only good for rough cuts? Think again. With just a handful of tools, a few simple steps, and a few hours, you can have your band saw working at peak performance.

Band Saw Table & Fence ____ 16

Take your band saw to the next level with a new table and fence. This extra-large table provides rock-solid support for just about any size workpiece. And the adjustable fence and accessories make it easy to produce accurate cuts every time.

Get More Out of Your Grinder ____ 22

With just six accessories, you can turn your bench grinder into a shop workhorse. Here's what you need to grind, sharpen, buff, and clean just about anything with ease.

Sharpening System ____ 24

This sharpening system for your bench grinder features an adjustable platform with sliding tool sleds. You'll be able to grind perfect bevels at almost any angle on your chisels and plane irons in no time at all.

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Shop-tested tips to solve common woodworking problems.

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How many table saw blades do you really need? We take a look at two that will handle just about anything.

Tool Chest ____ 34

Here's a splitter for your table saw you'll actually use. Why? Because you can install and remove it in seconds.

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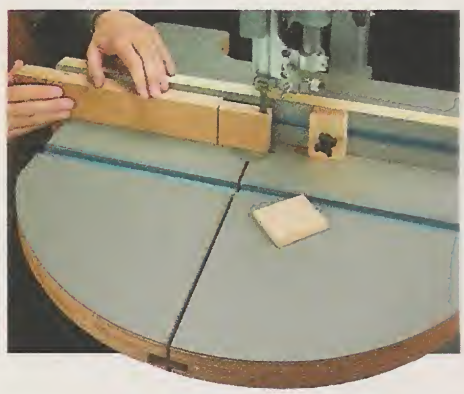
Mail-order sources and supplies to help you complete the projects featured in this issue.

Router Dado Jig *page 6*

Band Saw Tune-Up *page 12*



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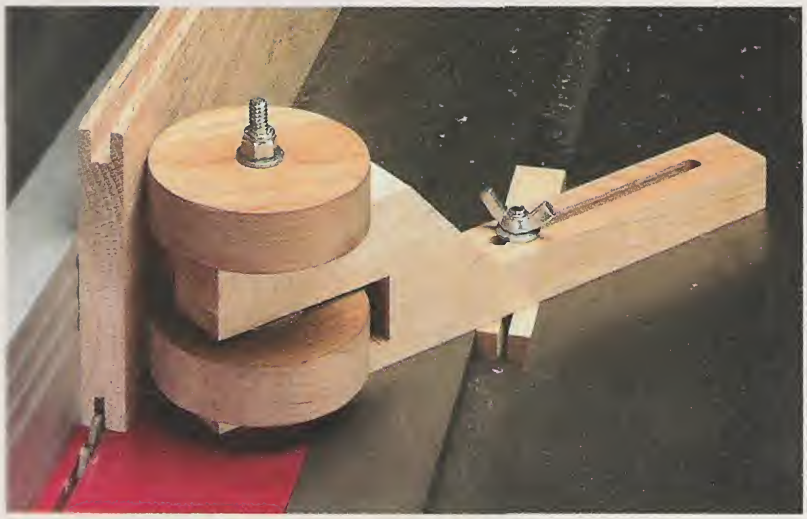
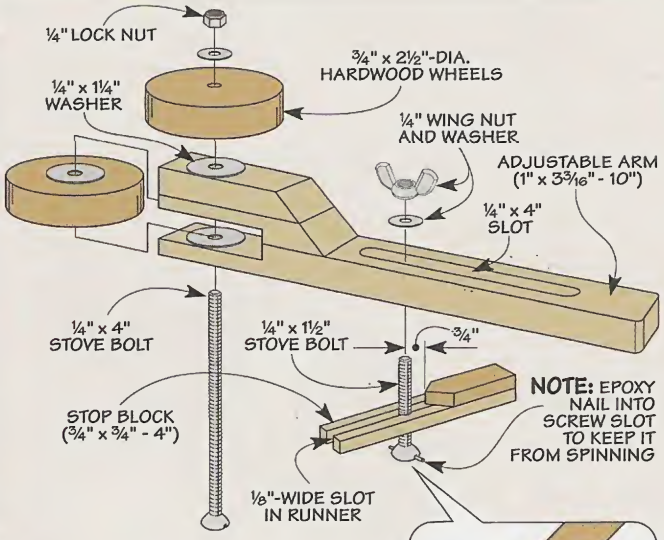
Readers' Tips

Roller Hold-Down

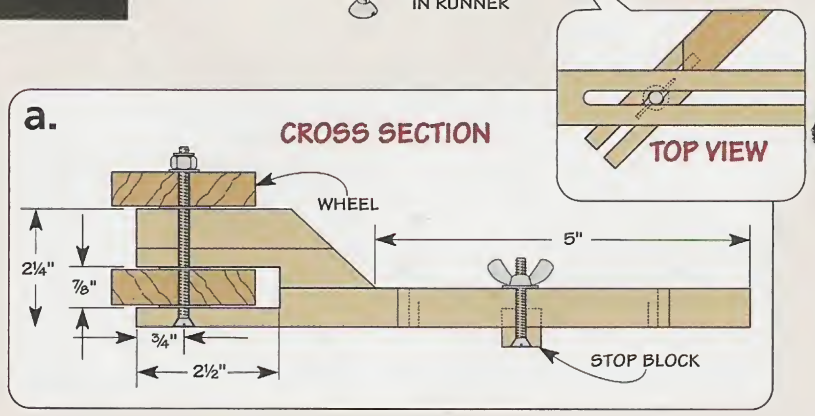




■ To cut small or thin parts on the table saw, I made a roller hold-down like you see in the photo above.

The hold-down consists of two main assemblies. The first assembly is a slotted runner and a stop block that rests in the miter gauge slot. It's connected to an adjustable arm by a stove bolt, washer and wing nut.

The tapered head of the stove bolt fits in a countersunk hole in the runner. As the wing nut is tightened, it pulls the head into the runner. The slot cut in the runner allows it to expand in the miter gauge slot and clamp it in place, as in detail 'a.'



The adjustable arm has two wheels mounted on one end that ride against the workpiece and hold it against the fence, as shown above.

Note: This hold-down won't prevent kickback like a featherboard.

Bob Siccone
Wilmington, Massachusetts

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Sign up to receive a free shop tip by email every week.

Router Table Gauge

■ Adjusting the fence on my router table can be a bit of a guessing game. When I need to move it only a small amount, it's very easy to overshoot the mark. To gain some needed accuracy, I built a simple gauge to hold a dial indicator, as you can see in the photo at right.

The holder is nothing more than a piece of ¾"-thick hardwood with a notch cut in it so it can be clamped to the front of the router table over the bit. Now I can easily see how much I need to move the fence for a perfect cut.

Len Urban
Rancho Mirage, California

Quick Tips

To replace the old pad on his sander, **Gordon Cummer** of Waterloo, Ontario cut a new one from a mouse pad.

▲ **Bobby Williams** of Wilson, NC used the larger blocks to double the capacity of his clamp storage rack from ShopNotes No.73.

◀ To make using the shop stool from ShopNotes No. 20 safer, **Albert Bach** of Iowa Falls, IA, added a hand rail made from ¾"-dia. conduit and four conduit clamps.

Shop-Made Small Clamp

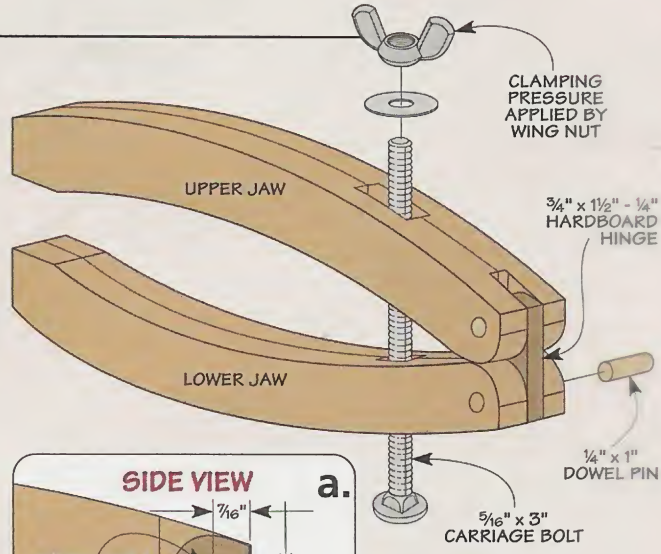
■ The old saying, "you can never have too many clamps" is certainly true. Recently, I was gluing up some small assemblies and needed a way to hold them together until the glue set up. I soon ran through my collection of small clamps. That's when I came up with the shop-built design you see in the drawing at right.

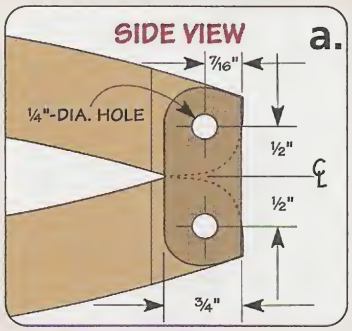
The clamp is made up of two hardwood jaws joined with a hardboard hinge. The clamping pressure is supplied by a carriage bolt, washer, and wing nut, as in the drawing at right.

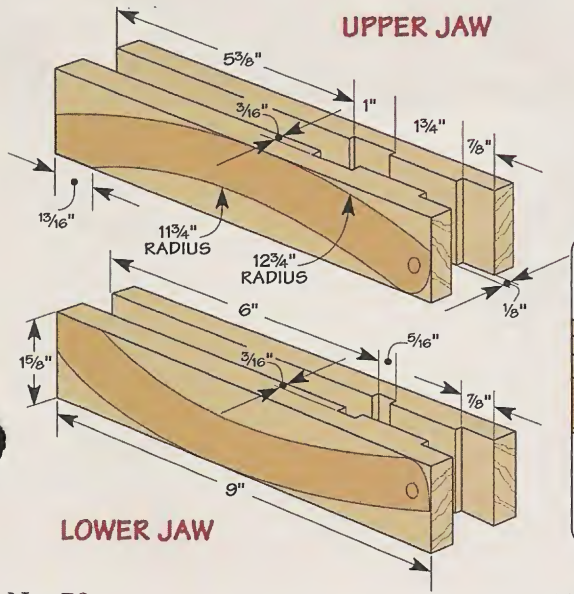
Each of the clamp jaws are made from two ½"-thick blanks. Before gluing them together, I cut a dado and a rabbet in each blank, as shown in the drawing below. The dado is sized to create a slot to hold the carriage bolt. (Note: the upper jaw has a larger slot to allow the clamp to open wider to grip thicker parts.) The rabbet is sized to fit the hinge.

When gluing the jaw blanks together, I inserted a waxed "key" in the dadoes to keep the pieces aligned, as you can see in detail 'b' below. Then you can cut the jaws to shape on the band saw and sand them smooth. Because this curved clamp is so easy to make, you can build a bunch of them in a short amount of time.

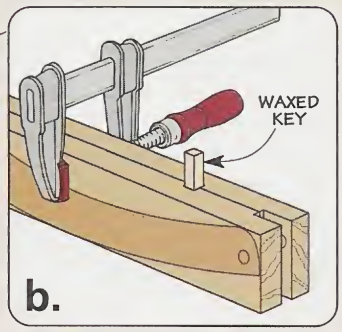
David Richards
Rochester, Minnesota







NOTE: CLAMP JAWS GLUED UP FROM ½"-THICK HARDWOOD



Send in Your Tips

To share your original tips and solutions to problems you've faced, send them to: *ShopNotes*, Attn.: Readers' Tips, 2200 Grand Ave., Des Moines, IA 50312. (Or if it's easier, FAX them to us at: 515-282-6741.)

We'll pay up to $200 depending on the published length. Please include a daytime phone number so we can call you if we have any questions.

Router Dado Jig

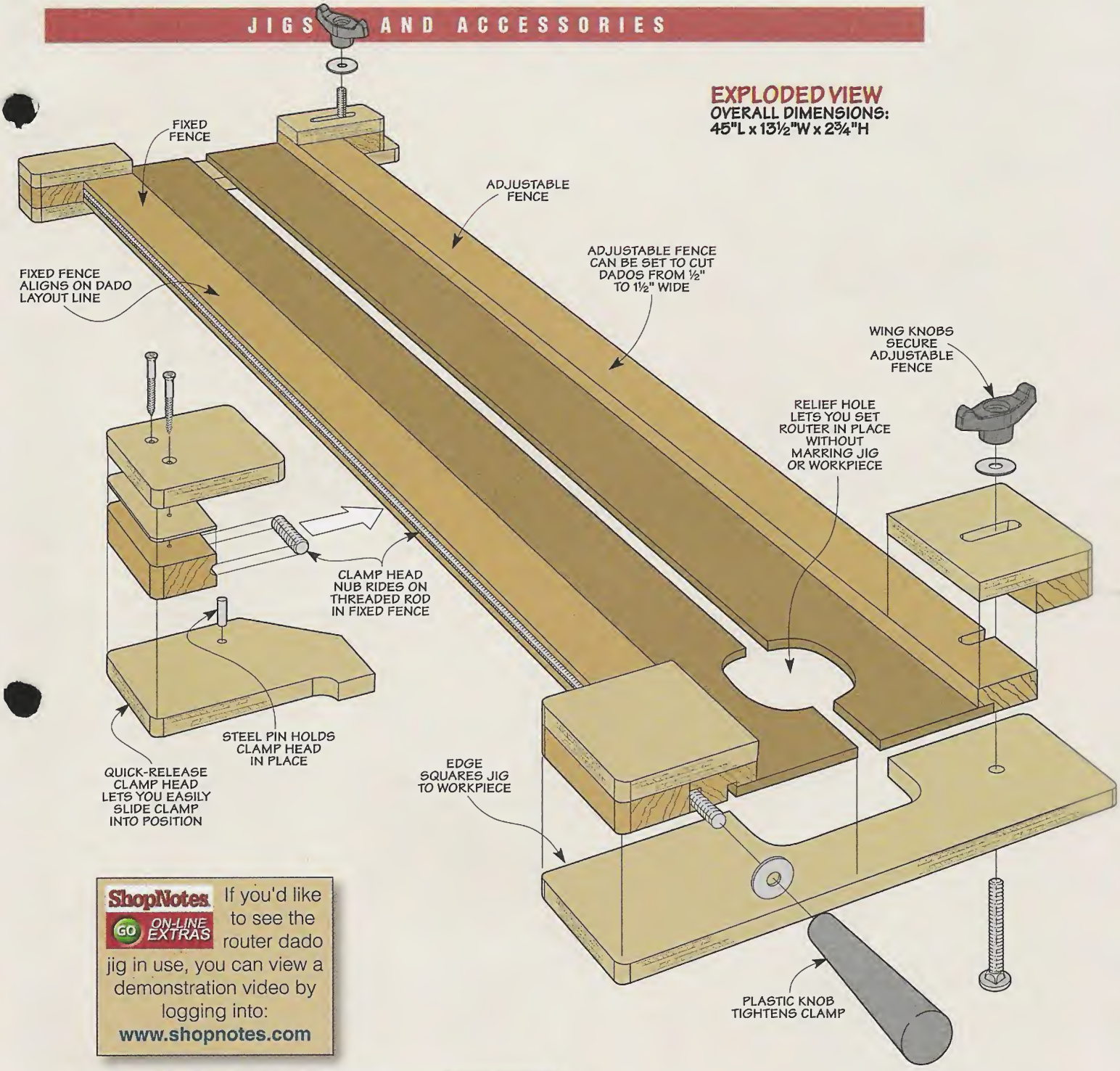
Set it. Lock it. Rout it. Cutting dadoes can be just that fast.

Sets up in seconds. No honestly, this isn't some catalog hype, you can really start routing with this jig in seconds. All you have to do is clamp the jig in place and set the dado width — that's it.

Standout Features – There are a few features to this jig that make it so easy to use. The best is the self-clamping mechanism that allows the jig to clamp directly to the workpiece without having to use a bunch of other clamps. With just one step, you can secure the jig to your workpiece and automatically square it to the edge as well. Another plus to this jig is that you can align it right on the dado layout lines.

There's no messing around with router base offsets here. The reason is that the jig is custom-fit to your router and bit when you build it. This lets you quickly set the jig in place and always know where the dado is going to be.

There's just one final feature that I want to mention about this jig. It's fully adjustable for any size dado from $\frac{1}{2}$" to $1\frac{1}{2}$" wide. This means that you won't have to guess at trial-and-error settings to custom-fit a dado to undersized plywood. All you need is the piece that will fit in the dado (or a cutoff) to set up for gap-free dadoes every time.



ShopNotes GO ON-LINE EXTRAS

If you'd like to see the router dado jig in use, you can view a demonstration video by logging into:
www.shopnotes.com

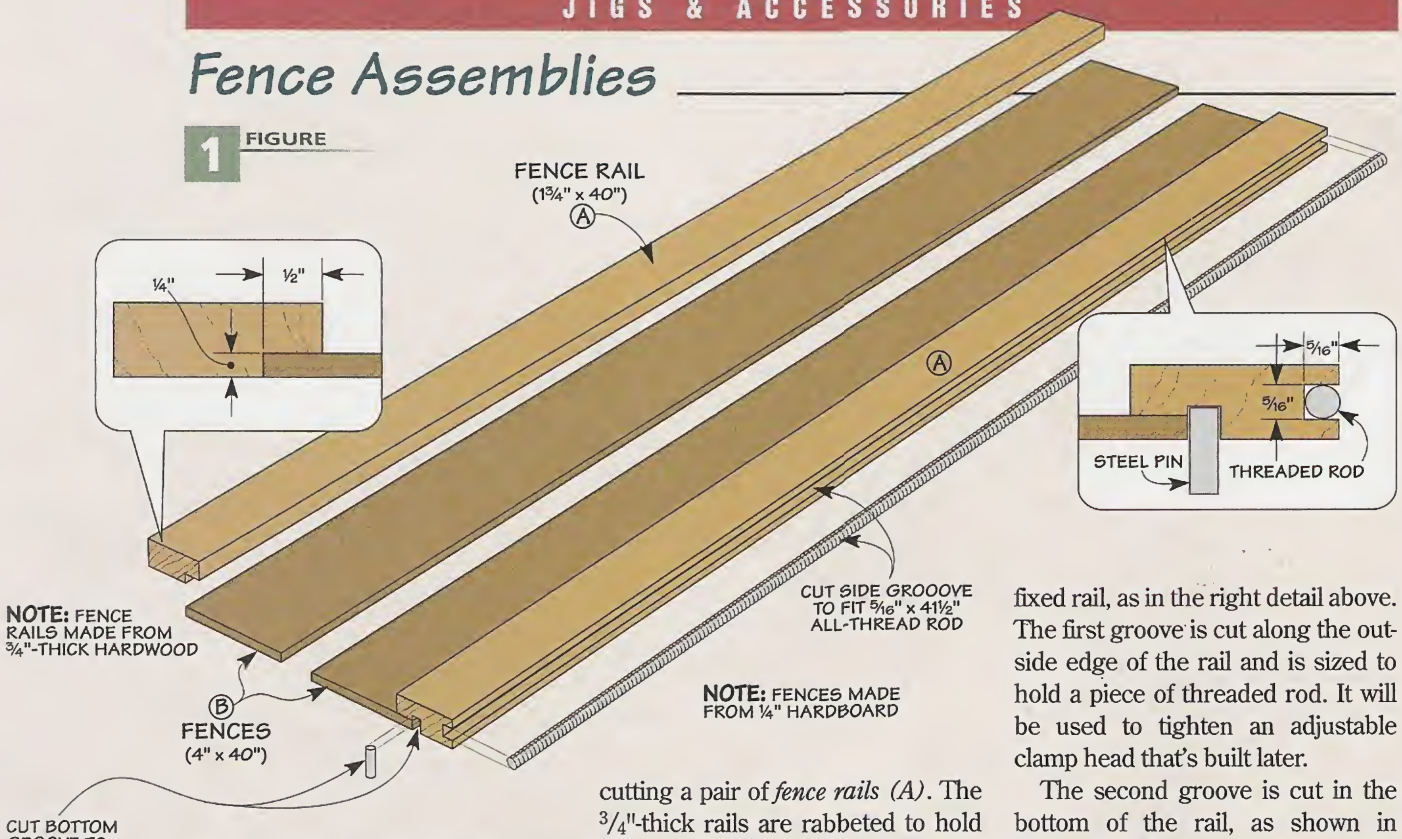
Materials

A	Fence Rails (2)	3/4 x 1 3/4 - 40
B	Fences (2)	3 1/4 x 1/4 - 40 Hdbd.
C	Front Bottom Plate (1)	3 1/2 x 13 1/2 - 1/2 Ply.
D	Rear Bottom Plate (1)	1 3/4 x 13 1/2 - 1/2 Ply.
E	Front Caps (2)	3 1/2 x 3 1/2 - 1/2 Ply.
F	Rear Caps (2)	1 3/4 x 3 1/2 - 1/2 Ply.
G	Front Spacer Blocks (2)	3/4 x 1 3/4 - 3 1/2
H	Rear Spacer Blocks (2)	3/4 x 1 3/4 - 1 3/4
I	Clamp Base (1)	4 x 5 3/4 - 1/2 Ply.
J	Clamp Spacer Block (1)	3/4 x 1 5/8 - 3 1/2
K	Clamp Cap (1)	3 1/2 x 3 1/2 - 1/2 Ply.

Hardware

- (3) 5/16" Washers
- (2) 5/16" x 2 1/2" Carriage Bolts
- (2) 5/16"-18 Wing Knobs
- (1) 5/16" x 41 1/2" Threaded Rod
- (1) 5/16" Nylon Lock Nut
- (1) 5/16" Tapered Knob
- (1) 5/16" x 3/4" Threaded Rod
- (1) 1/4" x 5/8" Steel Rod
- (2) #8 x 1 1/4" Fh Woodscrews

Fence Assemblies



The heart of the dado jig is the pair of fence assemblies shown above in Figure 1. These fences do several things. First, they guide the router as it's cutting the dadoes. Secondly, the hardboard base of each side is used to set the size of the dado. And finally, one of the fences is fixed in place on the jig and locates it on the layout line. The two fences just have a couple of minor differences.

Making the Fence Rails – To make the fence assemblies, start by cutting a pair of *fence rails (A)*. The ¾"-thick rails are rabbeted to hold ¼" hardboard fences, as in the left detail in Figure 1. I cut the rails extra long (about 48") so that I would have extra stock for making some spacer blocks that are added later.

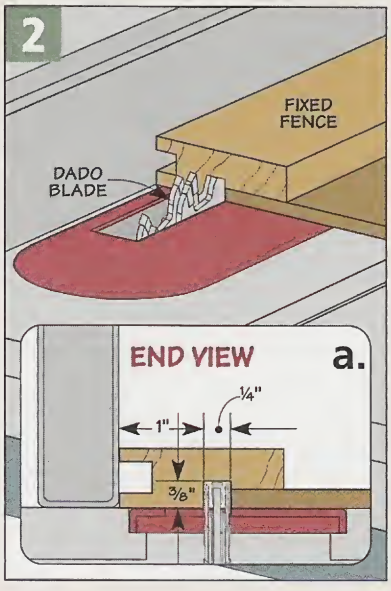
Hardboard Fences – After cutting the rabbets in the fence rails, two hardboard *fences (B)* are glued into the rabbets. I left the hardboard extra wide when gluing it in place so that it can be trimmed to size later.

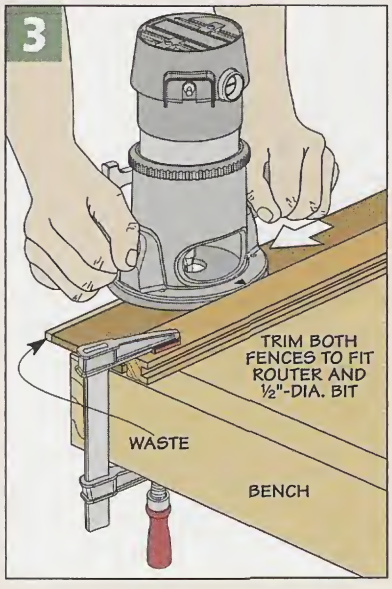
Next, a pair of grooves needs to be cut in the rail that will become the fixed rail, as in the right detail above. The first groove is cut along the outside edge of the rail and is sized to hold a piece of threaded rod. It will be used to tighten an adjustable clamp head that's built later.

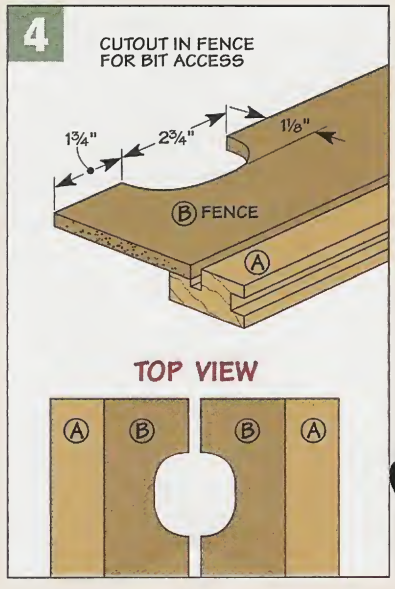
The second groove is cut in the bottom of the rail, as shown in Figure 2. This groove captures a steel guide pin on the clamp head. The guide pin holds the clamp head in place as it slides along the jig.

Once the grooves are cut, the fences can be trimmed to match the router and bit you'll be using with the jig, as in Figure 3. (I use a ½"-dia. straight bit for routing dadoes.)

There's just one thing left to do on the rails. Each rail needs a cutout in one end, as shown in Figure 4. The cutouts let you easily set the router







in place on the jig without the bit contacting the workpiece.

End Assemblies – With the fence assemblies complete, you can begin work on the two jig ends. The larger end registers the jig square to the workpiece. The "fixed" fence will be glued to one side of each end. The "adjustable" fence is held by carriage bolts, washers, and knobs.

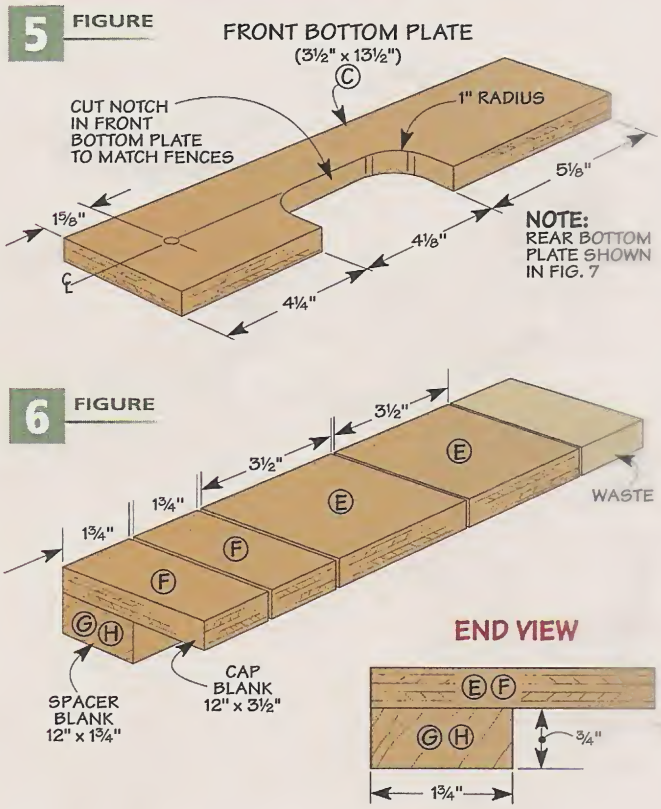
The *bottom plates (C, D)* are made from 1/2" plywood and have the corners rounded off. The larger, front bottom plate has a U-shaped cutout that matches the cutouts in the fences (Figure 5). And both bottom plates have a counterbored hole in one end to hold a 5/16" carriage bolt.

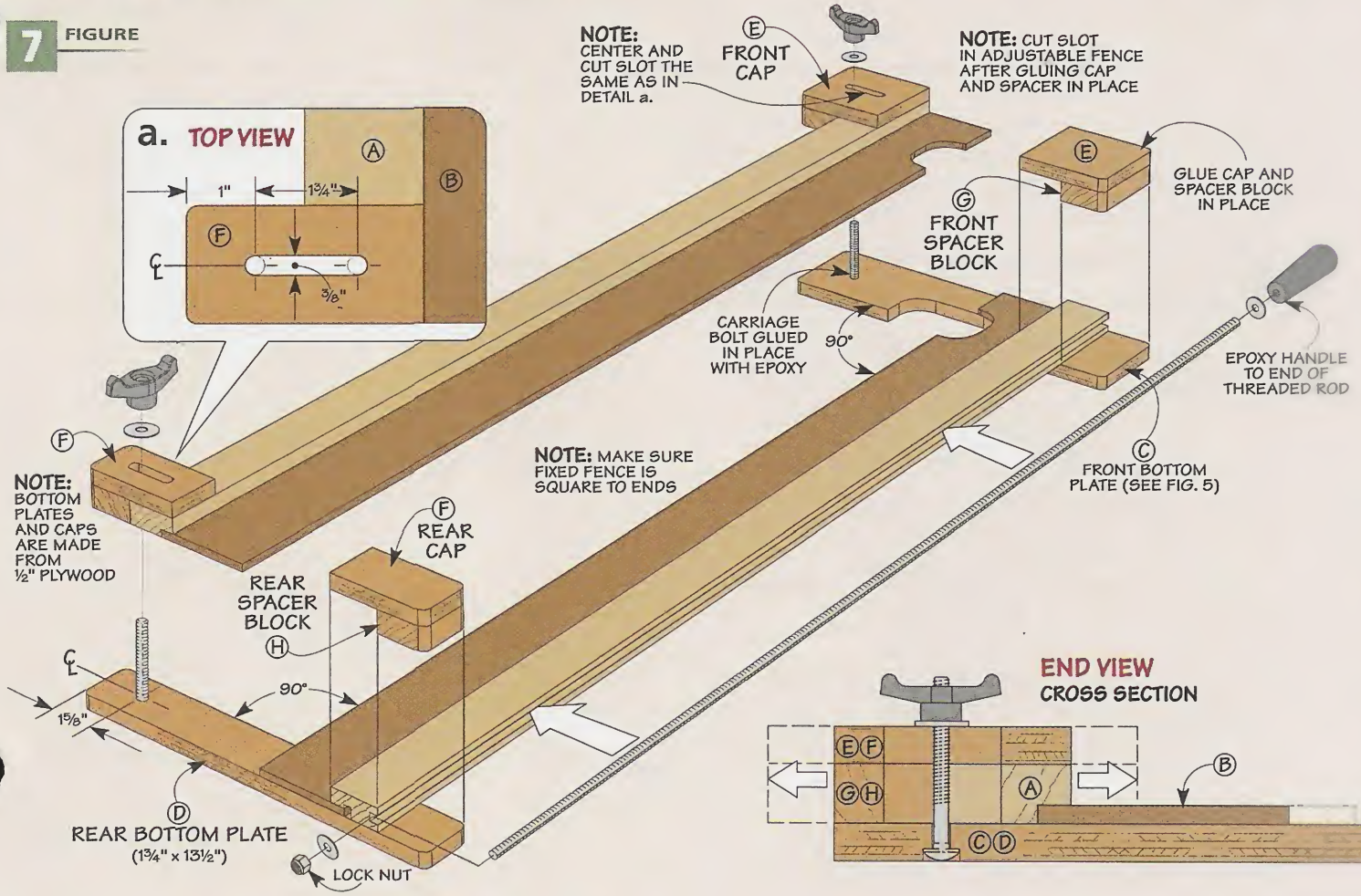
The upper part of the ends are formed by a spacer and a cap. To make them, I started with extra-long blanks for the *caps (E, F)* and spacer blocks *(G, H)*, as in Figure 6. As I mentioned before, the spacer blocks are cut from the same hardwood stock that I used for the fence rails.

Assembling the Ends – At this point, you can glue the fixed fence to the bottom plates. Here I took extra care to glue the fence absolutely square to the plates. This is the most important step in guaranteeing the accuracy of the dado jig.

The other fence is adjustable so you can customize the size of any dado you rout. It's connected to the bottom plates with carriage bolts that ride in slots cut in each end of the fence, as you can see in Figure 7. To hold the bolts in place, I glued them in with epoxy and secured the fences with washers and knobs.

Clamping Handle – I started making the clamp mechanism by fitting a piece of threaded rod in the groove cut in the fence rail. On one end of the rod, I glued a plastic handle in place with epoxy. On the other end is a washer and a nylon lock nut. The threaded rod should spin freely, but not have a lot of slop, so don't tighten the nut too much.





Quick-Release Clamp Head

▲ *Clamp Head. The self-clamping head locks the jig in place on the workpiece.*

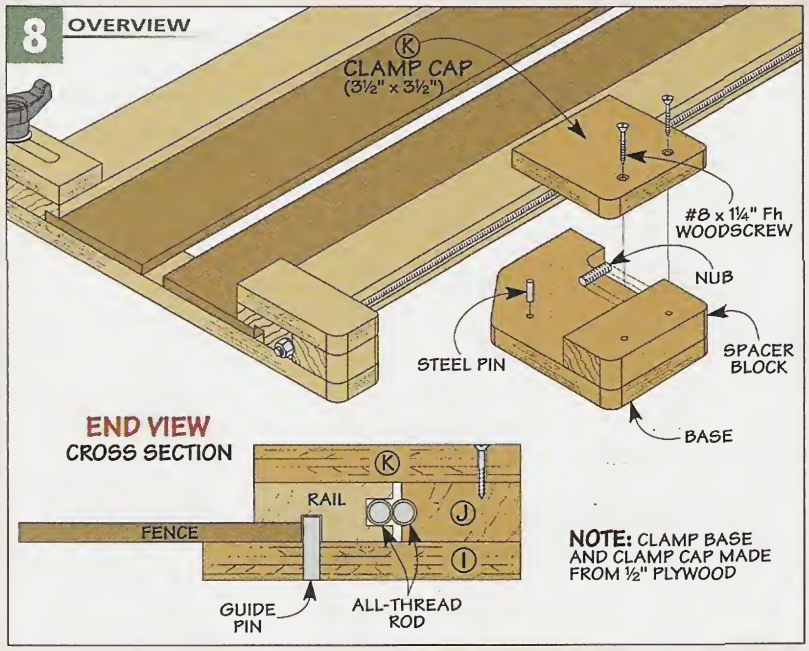
Although you could use the jig as it is to rout square, custom-sized dadoes, there's just one more feature to add — the quick-release clamp head. As you can see in Figure 8, the clamp head is made up of three parts: a base, a spacer block, and a cap.

Building the Clamp – The *clamp base (I)* is cut to shape from ½" plywood. A small finger at the end of the clamp base applies pressure to the workpiece and causes the clamp head to engage the threaded rod in the fence rail (box below).

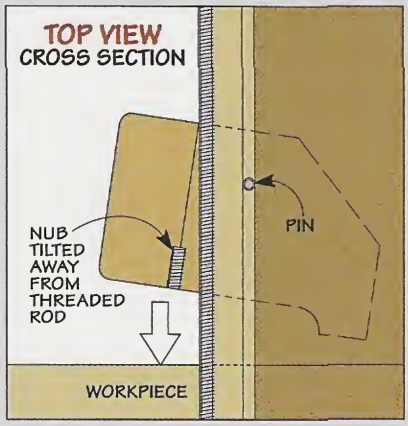
The second part of the clamp head is the *clamp spacer block (J)*. To make it, I started with an extra-wide hardwood blank. In order for the head to slide smoothly on the jig without binding, I made the clamp block slightly thicker than the fence rails. To do that, I glued a veneer shim to a piece of the same stock I used to make the fence rails.

Securing the Clamp – Now drill a hole in the blank to hold a short "nub" of threaded rod. Then you can rip the block to size leaving a half-hole in the block and glue the nub in place with epoxy, as in Figure 9. The block can now be glued to the clamp base and the corners rounded over.

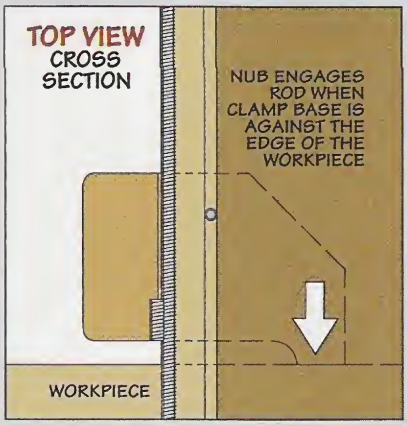
To hold the clamp head to the jig, I drilled a hole in the base and glued a steel pin to ride in the groove in the underside of the fence rail. Then you can cut a *clamp cap (K)* and round off the corners to match the base. With the clamp base in position on the jig, screw the cap in place.



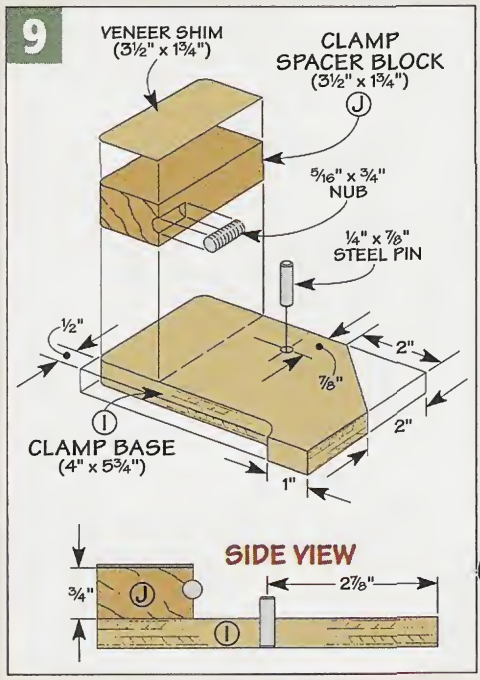
How the clamp works



▲ *Pivot and Slide. To adjust the clamp head, tilt it slightly to disengage the threaded rod. Then slide it against the workpiece.*



▲ *Engage and Clamp. Once the clamp head is against the edge of the workpiece, turn the knob clockwise to tighten it in position.*



Routing Custom-Sized Dadoes

The best part of the router dado jig is just how easy it is to get set up and start routing. And although the jig makes it almost foolproof to rout tight-fitting, gap-free dado joints, there are a few things you'll want to keep in mind to get the best results with the jig.

Setting the Router – First of all, make sure you use the same router and bit that you used when the jig was built. The fences were trimmed to match the distance from the edge of the router base to the bit, so a change in either one can cause the dado to be the wrong size.

And speaking of the router, it's a good idea to always keep the same edge of the router against the fence rails while routing. The bits in some routers aren't perfectly centered in the base. A slight variation can affect the size and the fit of the dado. I put an arrow on my router base, as you can see in the photo below. That way I know which side of the router to keep against the fence and my dadoes will always be sized accurately.

With the router ready to go, you can lay out the dadoes on the workpiece. Since the jig automatically squares itself to the workpiece, it's not necessary to mark layout lines all the way across the piece. I just mark them a few inches in. I also mark both sides of the dado so that I know which side of the layout line to rout on.

Routing Dadoes – Now you're ready to set the jig in place. Align the fixed fence of the jig on one of the layout lines. Then slide the clamp head in place and lock the jig in position. To set the dado size, simply loosen the adjustable fence and slip a cutoff or the actual piece that will fit in the dado between the hardboard fences, as illustrated in the photo above. After snugging up the adjustable fence by tightening down the knobs, you're ready to rout.

Set the router in the opening at the end of the jig and turn it on. With the router guided by the fence rails, the dado will be cut in two passes. After the first pass, turn the router around and complete the cut.

▲ *Routing the Dado.* For the best results, rout the dadoes with the same edge of the router base held against the fence rails. I drew an arrow on the router to serve as a reminder. First, rout all the way across the panel with the router against one fence.

▲ *Completing the Cut.* For dadoes wider than ½", you'll need to make a second pass along the other fence of the jig. To rout the other side of the dado, turn the router around so that the arrow side is against the other fence. Then rout back to the starting point.

Band Saw Tune-Up

Techniques for Precision Cuts

Slice thin veneers, make intricate scroll cuts, even cut accurate joints — with just one tool. You can turn your band saw into an all-purpose, precision workhorse. All you need are some simple tools and a few minutes of time.

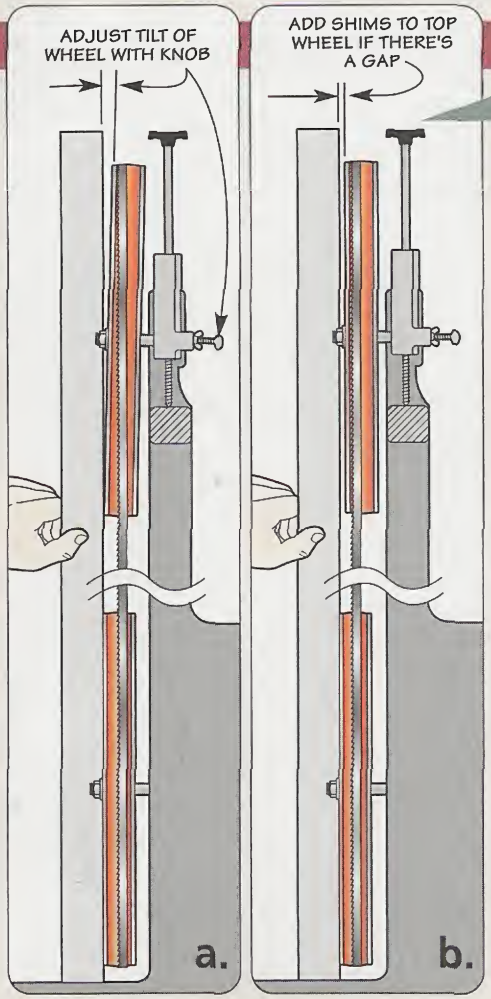
▲ **Accurate Cuts.** *You can be making precise cuts like this on your band saw. We'll show you how.*

The first few adjustments only need to be made occasionally, but they're still very important. So, how do you know when to do it? Personally, I like to give my saw a good once over every time I make a blade change or every few months, depending on how much I've been using it.

Safety First – It goes without saying that before you check or adjust anything on the band saw always unplug it. Never rely on the "on/off" switch for protection. Now is also a good time for you to take the blade off the wheels.

Look it Over – With the covers open it's a good idea to take a few minutes to look for any cracks in the frame, loose bolts, or other structural problems.

Before moving on you might also want to clean out any sawdust build up. This can interfere with the function of the blade and wheels of the saw.



▲ *Wheel Alignment. Adjust the wheels either by tilting the top wheel (detail 'a') or by repositioning one of the wheels (detail 'b').*

◄ *Vertical Wheel Alignment. A long straightedge placed across the top and bottom wheel makes it easy to check the alignment of the wheels.*

▲ *Tire Wear. The ridge on this tire was caused by setting the blade tension too high.*

TIRES AND WHEELS

Once the blade is off the next thing to do is to clean the tires. You can easily do this by rotating the wheels and holding an old toothbrush against the tire to clean off any accumulated sawdust or debris. This gives you the chance to inspect the tires for cracks and wear. Worn tires make it difficult to keep the blade tracking on the wheels (see photo in margin at right).

If your tire is bad, don't hesitate to replace it. Whenever you replace one of the tires it's best to replace the other at the same time.

Wheel Balance – It's easy to overlook the importance of having the wheels balanced and properly aligned. Out of balance wheels will cause the blade to wander. This will make it difficult for you to make consistently straight and accurate cuts.

There's a simple way to determine the balance of the wheels. Just mark a spot on one of the wheels and then give it a good spin. Note the position that it stops and then spin it several more times. If the mark on the wheel continues to stop in the same place your wheel is out of balance.

Rebalancing your wheels can be kind of tricky. Refer to your manufacturer's recommendation for rebalancing the wheels or take it to someone who can do this for you. If the wheel is significantly out of balance, you may want to consider replacing it with a new one.

Wheel Alignment – The other thing you'll want to check is the alignment of one wheel in relation to the other. Before you do this, you'll need to put the blade back on and tension it properly.

You'll find that blade tension affects the wheel alignment and making a change to one thing makes a change to all the others.

Checking the alignment of the wheels is easy but you may need to remove the table. Place a straightedge across the top and bottom of both wheels (photo above). If the straightedge touches both edges at the same time, the wheels are in proper alignment (co-planar).

You won't always find perfect alignment of the wheels when you check them. But you'll want to see the wheel rims within about $1/16$" of the straightedge.

If the straightedge doesn't touch both edges, tilt the top wheel by adjusting the tracking knob until the straightedge just barely touches the lower wheel (see detail 'a').

And if the wheels are still not aligned, you many need to use washers or another type of shim to reposition one of the wheels (see detail 'b').

Blade and Guides

Once the tires and wheels are in good shape, you can move on to a few other adjustments that you'll need to make more often.

BLADE TENSION AND TRACKING

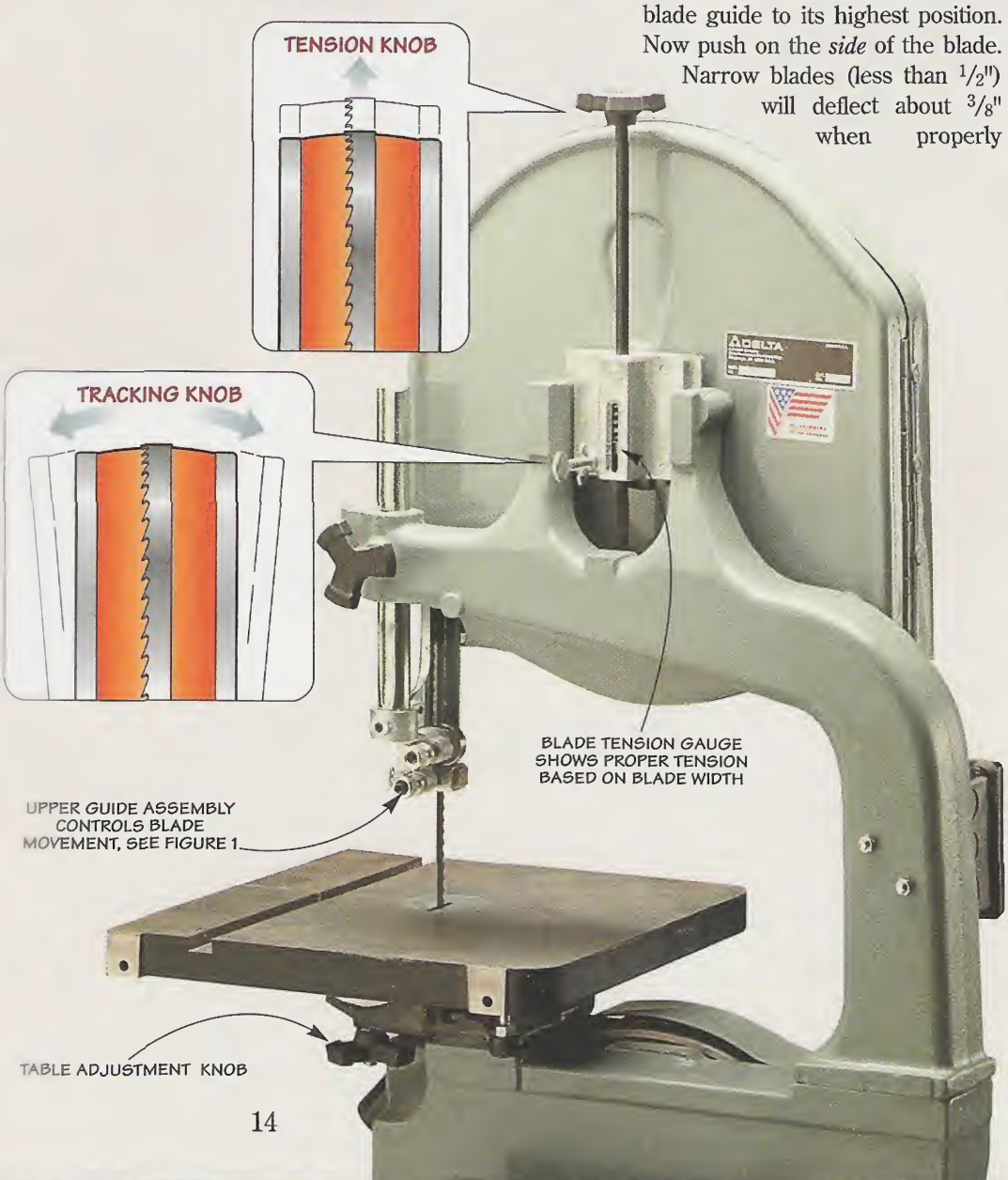
I start by taking a look at the blade tension and tracking. Tension refers to the tightness of the blade on the saw. Tracking is the path the blade takes on the wheels. These two settings can be adjusted by a pair of knobs on the back of the saw, as shown in the photo below.

To keep the band saw cutting straight and true, the flexible blade needs to be pulled tight. The tension knob does this by moving the wheels farther apart. Different width blades require different tensions. When there's not enough tension on the blade it can wander and leave a "cupped" cut in the workpiece.

You may have heard that increasing the tension is an easy way to solve your cutting problems. But doing this puts a lot of stress on the frame of the saw and will shorten the life of the wheel bearings and blades.

Most saws have a tension gauge as a reference for tensioning different blade sizes, (see photo below). I've found that it's not very accurate, but it will get you close.

To get the tension set correctly, I do a simple push test. First, raise the blade guide to its highest position. Now push on the *side* of the blade. Narrow blades (less than $1/2$") will deflect about $3/8$" when properly tensioned. The wider blades should deflect no more than $1/4$".



▲ *Safety Tip. To prevent catching your fingers in the wheel, use a short dowel to spin the wheel by hand with the saw unplugged.*

Blade Tracking – If your wheels are properly aligned and balanced and you have the right tension on the blade, getting the blade to track properly should only take a minor adjustment. What you're looking for is to have the blade run near the center of the tire.

To check the tracking, unplug the saw and open the door. Then with a short piece of dowel, rotate the upper wheel several times, as illustrated in the photo above. If needed, turn the tracking knob or screw until the blade stays in the middle of the wheel as it is turned.

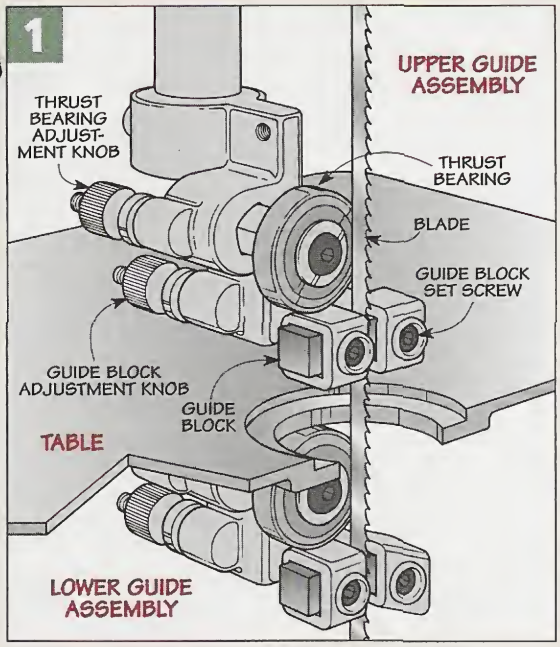
Remember to take it slow when adjusting the tracking. If you turn the screw too much, the blade can run off the edge of the wheel and you'll need to start over.

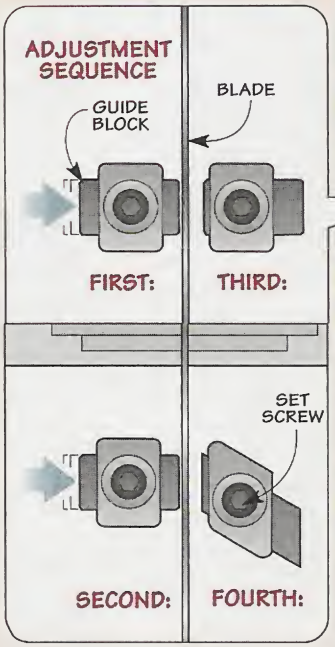
GUIDES AND THRUST BEARINGS

With the tension and tracking set, there are just a few steps left before you're ready to go.

The next things to check are the two guide assemblies. One is located above the table and one below the table, as illustrated in Figure 1.

Each guide assembly consists of a pair of guide blocks and a thrust bearing located behind the blade. The purpose of the guides and bearings is to keep the flexible blade running straight and true. If they're not set right, the blade can end up twisting and get pushed off the wheel or even break.





◀ *Guide Blocks. A business card helps position the guide blocks. Adjust the blocks on one side and then the other (sequence at left).*

◀ *Thrust Bearing. Use a business card folded in half to set the position of the thrust bearing.*

You'll need to make two different adjustments. One for the guide assembly and the second to each of the guide blocks.

Guide Assembly – Before adjusting the guide assembly, it's a good idea to loosen the guide blocks and back them away from the blade. Don't take them all the way out because you will need them as a reference for the next adjustment.

Next, loosen the thumbscrew and slowly move the guide blocks either forward or backward on the blade, as shown in Figure 2.

The guide blocks should be positioned just behind the gullets on the blade, as illustrated in Figure 2a. After setting the upper guide assembly, set the guide assembly below the table.

Guide Blocks – With the guide assemblies set, you can adjust the guide blocks. As I mentioned before, they straddle the blade and keep it on track. They should be positioned close to, but not touching, the blade.

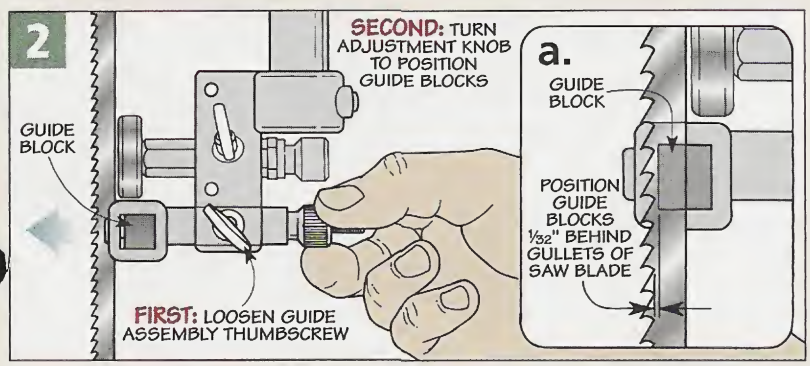
I use a business card to set the spacing, as shown in the upper right photo. The drawing above shows the sequence for setting the blocks. Here I set the blocks on one side of the blade then the other to prevent the blade from being misaligned.

Just place the card between the blade and the guide block and move the guide block until it rests snug against the card. Then just tighten the adjustment screw.

Once all four adjustments have been made, you'll want to turn the wheels (by hand) a couple of times to be sure that there is adequate clearance for the blade.

Thrust Bearings – There's one more part to be adjusted on the guide assemblies — the thrust bearing. It supports the blade from the back when cutting. If the thrust bearing is not supported from the back, the blade won't give you square cuts and may even get pushed off the wheels.

You can use your business card again. This time fold it in half and place it between the back of the blade and the thrust bearing, as shown in the lower photo above. Position the thrust bearing against the card and tighten the thumbscrew to hold the bearing in place.



SQUARE UP THE TABLE

Once the guides and thrust bearings are set, you can make the final adjustment. That is to check that the table is square to the blade. If it's not, your cuts won't be perpendicular.

Just raise the upper guide assembly and place a small square on the table against the blade, as you can see in the photo at right. If the table isn't square, loosen the table adjustment knob and tilt the table into position. Then retighten the knob.

It's all too easy to put off these simple adjustments. But it only takes few minutes to run through them. With your saw tuned, you'll turn to it more often and get better results in your woodworking projects.

▲ *Square the Table to the Blade. Using a small square, make sure the blade is 90° to the table.*

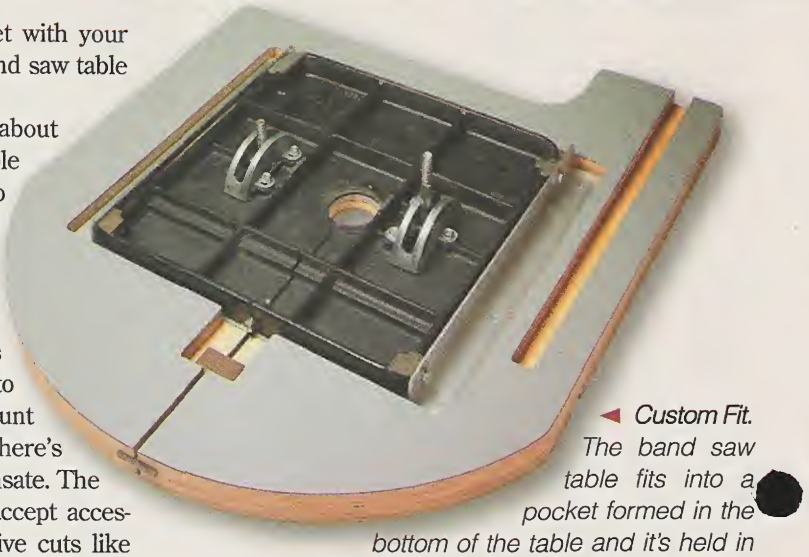
Band Saw Table & Fence

Increase the capability of your band saw by adding this feature-packed table and fence.

Want to improve the results you get with your band saw? With the shop-made band saw table and fence shown above, you can.

Large Worksurface – Handling just about any size workpiece on this oversized table isn't a problem. The table mounts securely to the cast iron table of the band saw, as you can see in the photo at right.

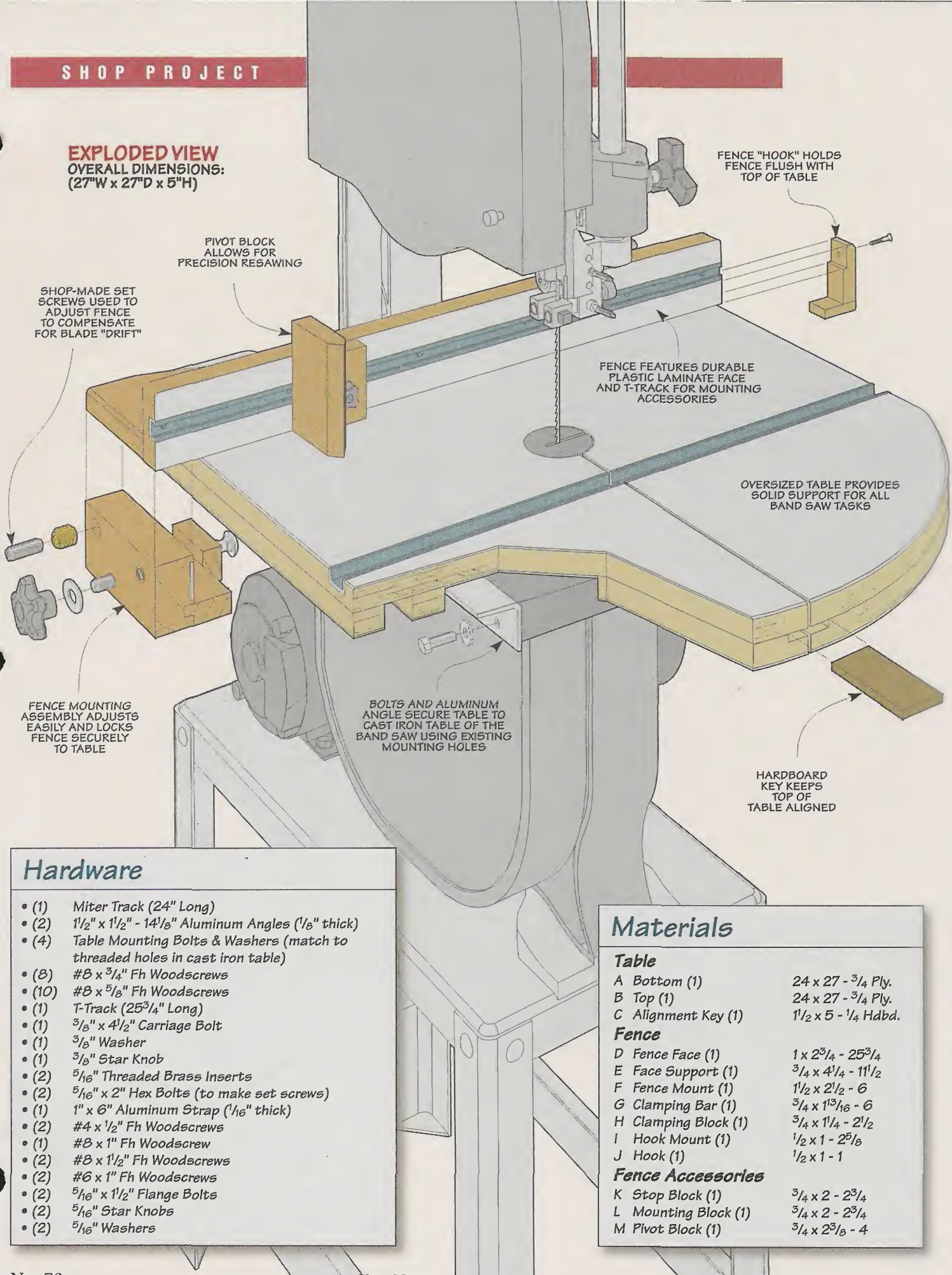
Adjustable Fence & Accessories – The table isn't the only thing to like about this project. There's a fence that adjusts quickly and locks down firmly, so it's a snap to make straight, accurate cuts. And to account for the tendency of some blades to "drift," there's a simple adjustment mechanism to compensate. The fence also features a piece of T-track to accept accessories — a stop block for making repetitive cuts like tenons, and a pivot block for accurate resawing.



◀ *Custom Fit. The band saw table fits into a pocket formed in the bottom of the table and it's held in place by a pair of aluminum angles.*

EXPLODED VIEW

OVERALL DIMENSIONS:
(27"W x 27"D x 5"H)



Hardware

- (1) Miter Track (24" Long)
- (2) 1 1/2" x 1 1/2" - 14 1/8" Aluminum Angles (1/8" thick)
- (4) Table Mounting Bolts & Washers (match to threaded holes in cast iron table)
- (8) #8 x 3/4" Fh Woodscrews
- (10) #8 x 5/8" Fh Woodscrews
- (1) T-Track (25 3/4" Long)
- (1) 3/8" x 4 1/2" Carriage Bolt
- (1) 3/8" Washer
- (1) 3/8" Star Knob
- (2) 5/16" Threaded Brass Inserts
- (2) 5/16" x 2" Hex Bolts (to make set screws)
- (1) 1" x 6" Aluminum Strap (1/16" thick)
- (2) #4 x 1/2" Fh Woodscrews
- (1) #8 x 1" Fh Woodscrew
- (2) #8 x 1 1/2" Fh Woodscrews
- (2) #6 x 1" Fh Woodscrews
- (2) 5/16" x 1 1/2" Flange Bolts
- (2) 5/16" Star Knobs
- (2) 5/16" Washers

Materials

Table	
A Bottom (1)	24 x 27 - 3/4 Ply.
B Top (1)	24 x 27 - 3/4 Ply.
C Alignment Key (1)	1 1/2 x 5 - 1/4 Hdbd.
Fence	
D Fence Face (1)	1 x 2 3/4 - 25 3/4
E Face Support (1)	3/4 x 4 1/4 - 11 1/2
F Fence Mount (1)	1 1/2 x 2 1/2 - 6
G Clamping Bar (1)	3/4 x 1 13/16 - 6
H Clamping Block (1)	3/4 x 1 1/4 - 2 1/2
I Hook Mount (1)	1/2 x 1 - 2 5/8
J Hook (1)	1/2 x 1 - 1
Fence Accessories	
K Stop Block (1)	3/4 x 2 - 2 3/4
L Mounting Block (1)	3/4 x 2 - 2 3/4
M Pivot Block (1)	3/4 x 2 3/8 - 4

Making the Table

▲ *Access. A small cutout in the bottom of the table provides access to the pin and hardboard key that keep the surfaces of the cast iron table and the auxiliary table aligned.*

The main thing I like about this table is the larger worksurface it provides compared to the standard cast iron table on my band saw. It provides solid support so I can easily work with just about any size workpiece.

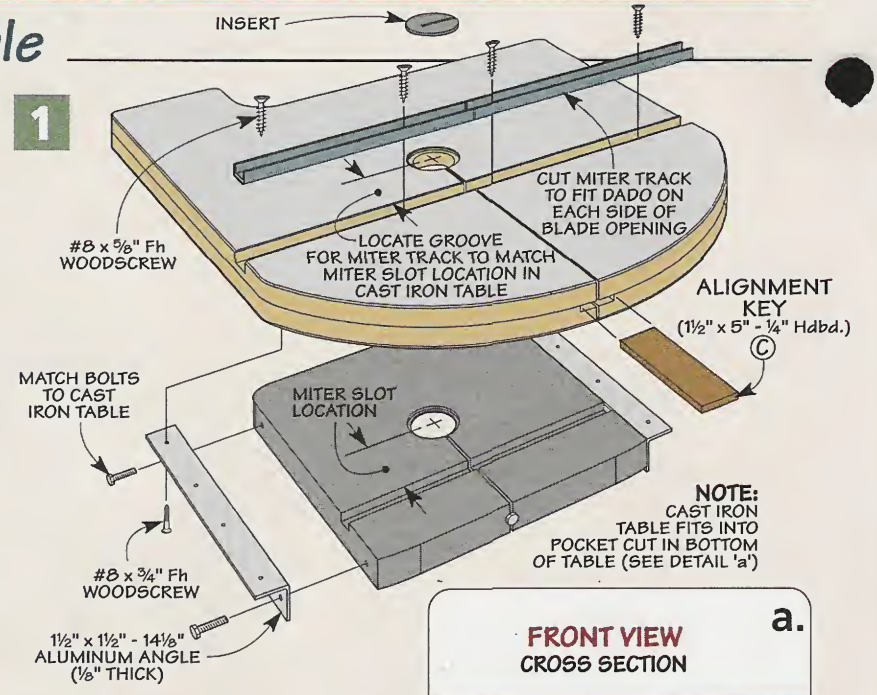
To get an overview of the table, take a look at Figure 1. For starters, the table is made of ¾" Baltic birch plywood covered with layers of plastic laminate on the top and bottom. The laminate provides a smooth, durable surface and keeps the table flat. A pair of aluminum angles are used to attach the table to the cast iron table of the band saw.

Table Size – The first step in building the table is to determine its overall size. Of course, it should be big enough to provide support for a large workpiece. But don't get carried away. If the table is too wide (or long), it will be a hassle to work around.

Design Note: This table is sized and shaped for a 14" band saw (the distance from the band saw column to the blade). You may need to modify the size and shape for your band saw.

Start with the Bottom – Since the cast iron table fits into a pocket in the band saw table, I started building by working from the bottom up. The first thing I did was to cut the *bottom (A)* to final width and length. Then I glued a piece of plastic laminate to its bottom face, like you see in Figure 2.

The next step is to locate and size the pocket for the cast iron table. The easiest way to do this is to remove the cast iron table from your band saw and use it as a template. (My table comes off by simply removing the knobs that allow you to tilt the table.)

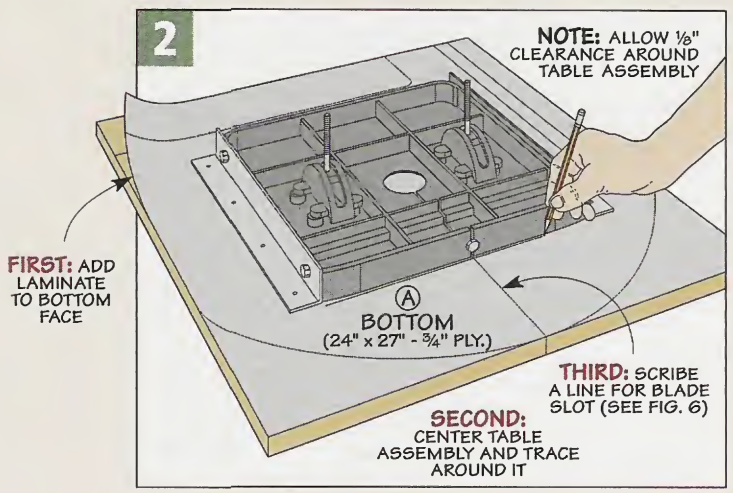


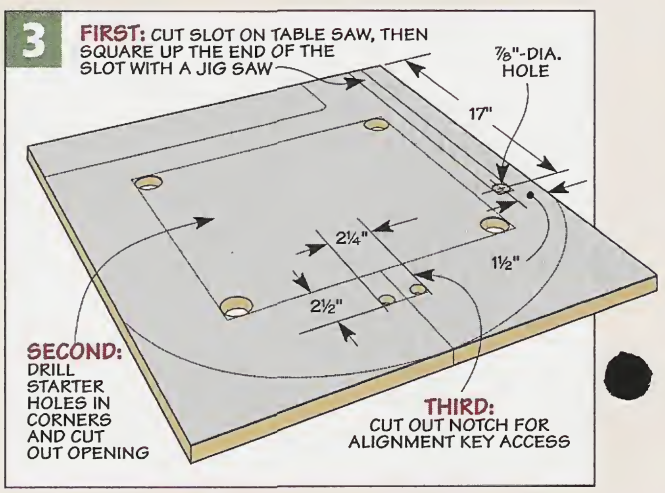
At this point, I cut a pair of aluminum angles to size and attached them to the cast iron table, like you see in Figure 1. The angles attach to the table using mounting holes already drilled in most band saw tables. You'll need to buy the mounting bolts to fit your saw.

Once the angles are attached, set the assembly on the bottom so it's centered both side to side and front to back, as illustrated in Figure 2. Then trace around the outside of the table and aluminum angle, providing 1/8" clearance all around.

Before cutting out the opening, it's a good idea to cut a slot along the edge of the bottom for mounting the fence. You can see this clearly in Figure 3. I did this by drilling a hole to establish the end of the slot and then raising my saw blade as high as it would go and cutting the waste free.

With that complete, you can create the opening. Figure 3 shows



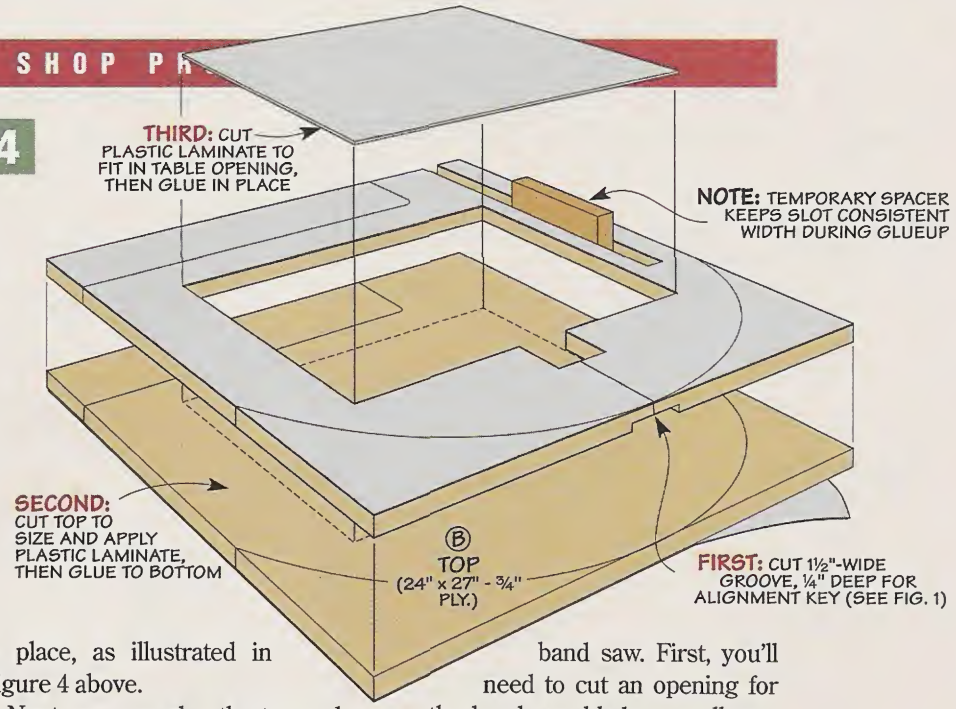


how to do this by drilling starter holes in the corners and then using a jig saw to remove the waste.

Alignment Pin & Key Access – You'll also notice a small notch near the front edge of the table (Figure 3). This opening provides access to the metal pin that keeps the cast iron table aligned across the slot that provides access to the band saw blade.

The opening also makes it easy to get to a hardboard key that keeps the top of the band saw table flush during use. You can see this in the margin photo on the opposite page. To create the slot for the key, you'll need to cut a wide, shallow dado in the front of the table to fit the 1/4" hardboard key (Figure 4).

Add the Top – Once you've completed the dado, you're ready to add the top of the table. The *top (B)* is identical in size to the bottom. And like the bottom of the band saw table, the upper surface of the top has a piece of plastic laminate glued in place, as illustrated in Figure 4 above.



Next, you can glue the top and bottom together. A spacer ensures that a consistent slot width is maintained. Finally, cut a small piece of laminate to fit the opening in the table and glue it in place (Figure 4).

There are just a few things left to do before mounting the table to the band saw. First, you'll need to cut an opening for the band saw blade as well as a slot to allow for installing (and removing) the blade.

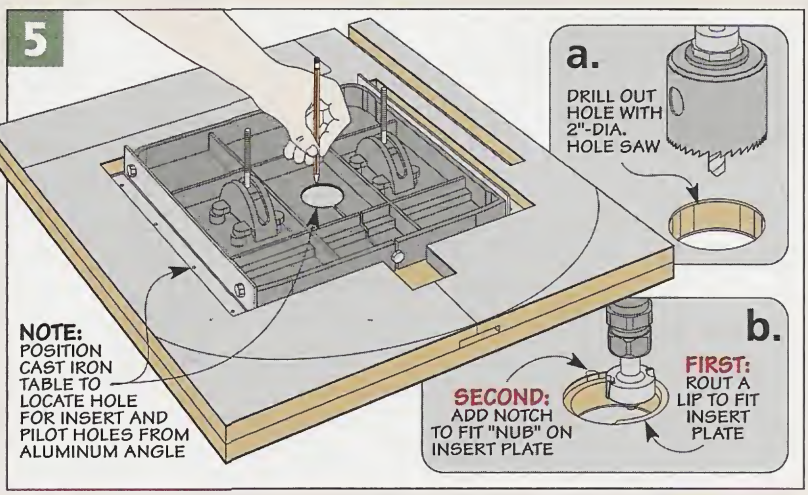
To locate the hole, simply set the cast iron table in place and trace an outline of the hole on the bottom of the table (Figure 5). Figures 5a and 5b show how I used a hole saw to form the opening and a rabbeting bit to create the lip for the metal insert of my band saw table. Note: You'll need to drill a small hole along the edge of the recess to allow the "nub" of the insert plate to fit.

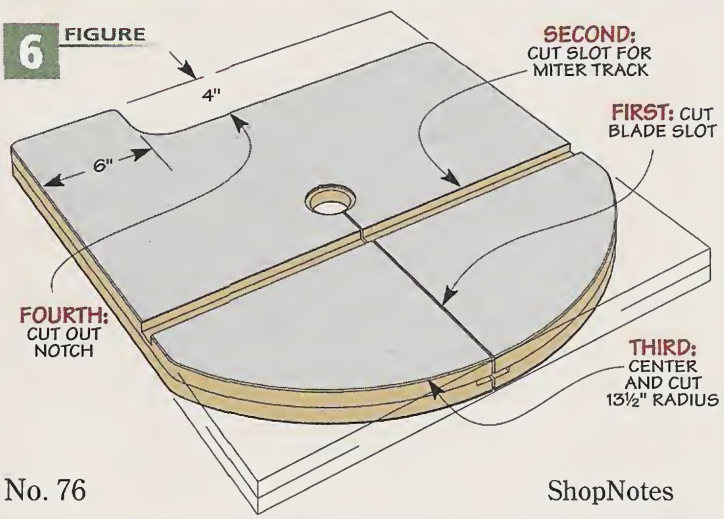
With the hole complete, you can cut the slot from the front of the table to the hole. To do this, raise your saw blade as high as it will go and then make a single pass centered on the hole, as in Figure 6.

At this point, you're ready to cut a dado on the top side of the table. The dado accepts two pieces of miter track that allow you to use your miter gauge for making a cut. Locate the dado to match the miter slot in your cast iron table.

Now you can shape the table as shown in Figure 6. This removes the sharp edges and provides plenty of clearance to tilt the table when you need to make an angled cut.

All that's left to do before mounting the table is to cut a couple pieces of miter track to fit the dado and screw them in place (Figure 1). Then you can cut a 1/4" hardboard *alignment key (C)* and slip it into place.





Add the Fence

The curved cuts I make on my band saw don't require a fence. But cutting tenons, ripping pieces to width, and resawing require a fence that adjusts easily, locks securely, and accepts accessories.

The fence you see in Figure 7 meets all those needs. The fence houses a piece of T-track so you can attach accessories and the mounting assembly adjusts easily yet locks securely to hold the fence in place.

Make the Fence Face – I started on the fence by making the face. The *fence face (D)* is just a 1"-thick piece of hardwood. To allow a workpiece to slide smoothly along the face, I attached a strip of plastic laminate to one side. Then to mount the accessories, I cut a centered groove and installed a piece of T-track, as in Figure 8a.

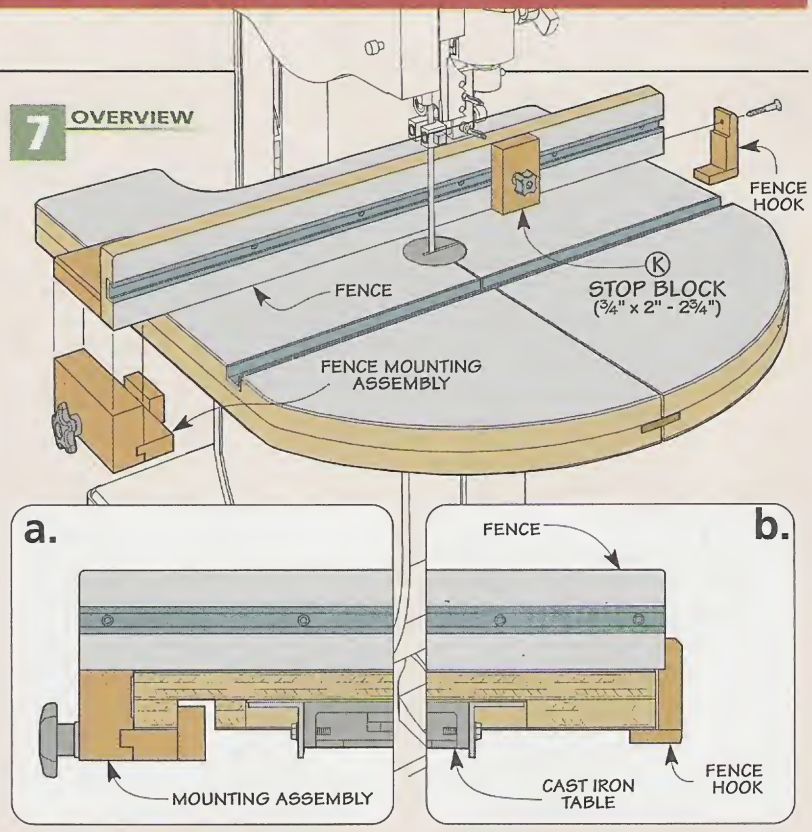
Attaching the fence face to the mounting assembly is just a matter of adding a *support (E)* to the back side of the face. Figures 8 shows how the support is shaped.

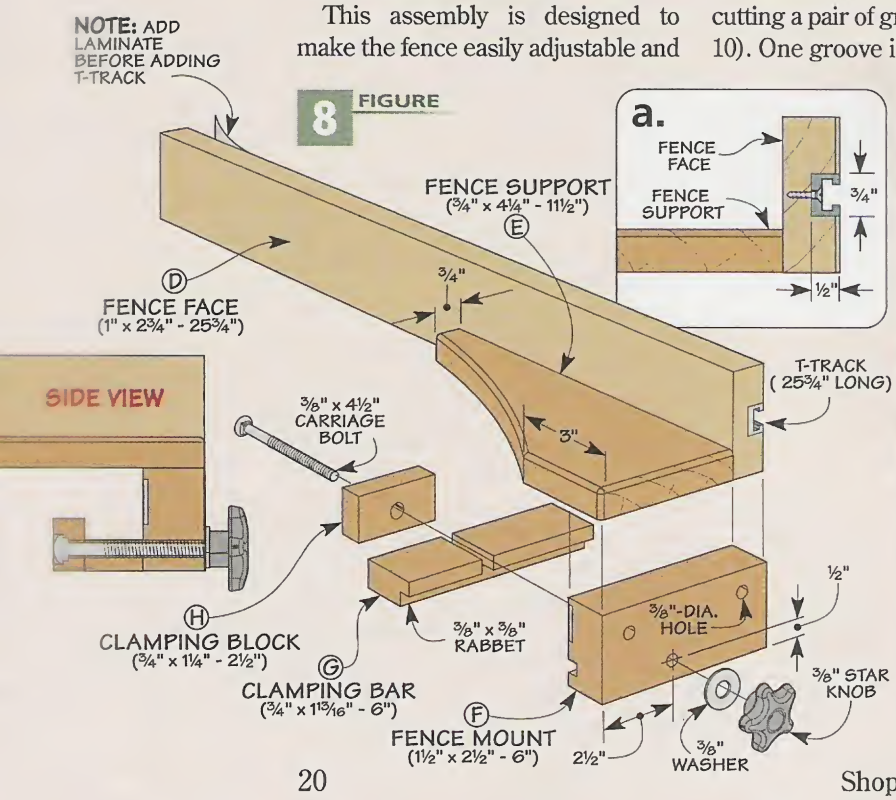
Fence Mount – With the fence assembly complete, you can turn your attention to the mounting assembly the fence attaches to.

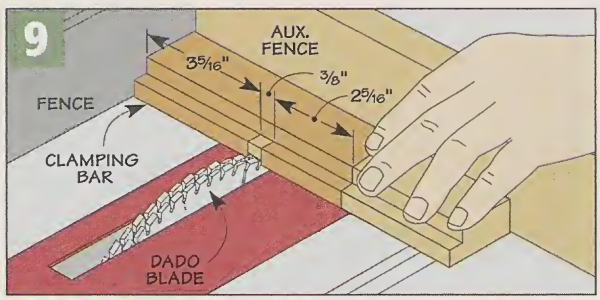
This assembly is designed to make the fence easily adjustable and lock securely. As you tighten a knob on the front of the mounting assembly, it pulls a clamping block tight to "pinch" the fence against the table, as you can see in Figure 7a.

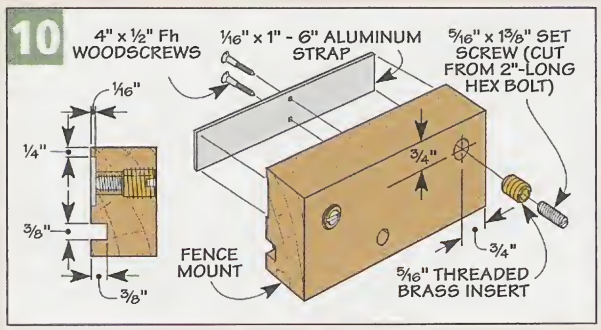
I started on the assembly by making the *fence mount (F)* from a piece of $1\frac{1}{2}$"-thick hardwood and cutting a pair of grooves in it (Figure 10). One groove is wide and shallow to accept an aluminum strip. The strip allows you to angle the fence to compensate for any blade "drift." To do this, a pair of shop-made set screws (cut-off hex bolts with a slot cut in them) can be adjusted to "tweak" the angle slightly.

The other groove accepts the rabbet cut on the end of a *clamping bar (G)*. A small *clamping block (H)*









attached to the edge of the bar fits into the slot on the bottom of the table. To lock the fence in place, a carriage bolt glued into the clamping block passes through all three parts of the assembly (Figure 7a).

With the mounting assembly complete, you're ready to glue the fence assembly to it. First, cut the fence to length so it extends 1/4" past the edge of the table when it's flush with the mount at the front end of the table, as in Figures 7a and 7b. Then glue the fence in place so it's parallel to the miter slot in the table.

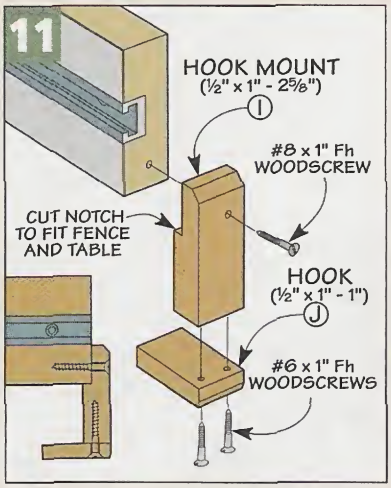
Add the Fence Hook – All that's left to complete the fence is to add a *hook (I, J)* to the end to hold the fence tight against the table. You can see how I did this in Figure 11.

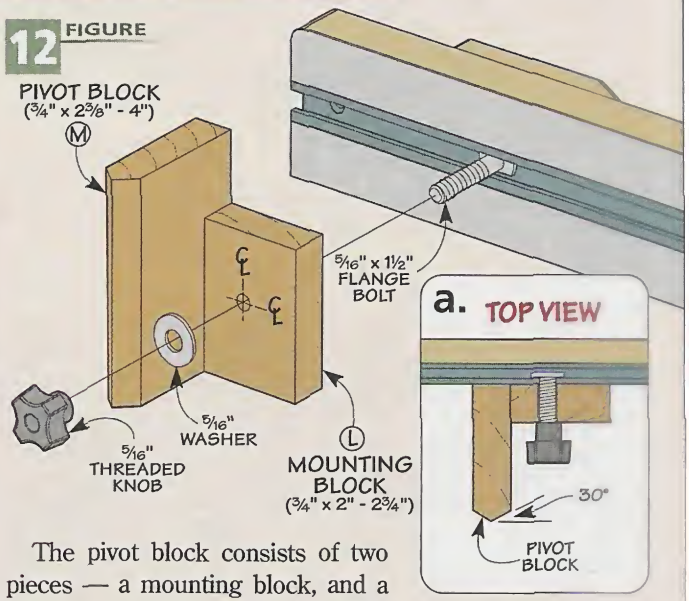
MAKE THE ACCESSORIES

You can use the fence just the way it is. But to get more out of it, you'll want to add a pair of handy accessories — a stop block and a pivot block.

Stopped Cuts – The *stop block (K)* makes stopped cuts a snap and it's just a 3/4"-thick piece of hardwood. A hole in the block makes it easy to mount the stop to the T-track (Figure 7 and photo below).

Resaw with Ease – A band saw is tailor-made for cutting thick stock into thinner pieces. But that isn't always easy to do using the fence as a guide. Instead, I like to use a pivot block that allows me to make small adjustments to track perfectly along the line of the cut (Figure 12).

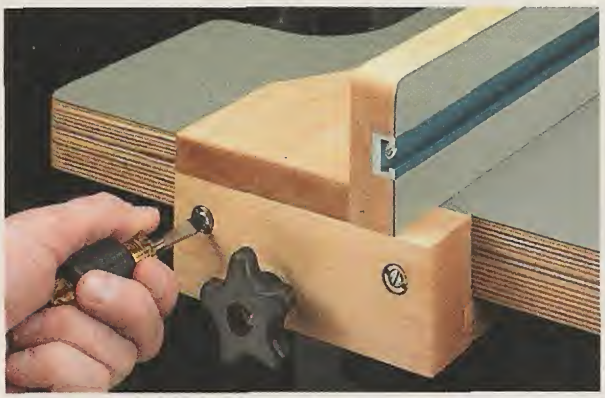




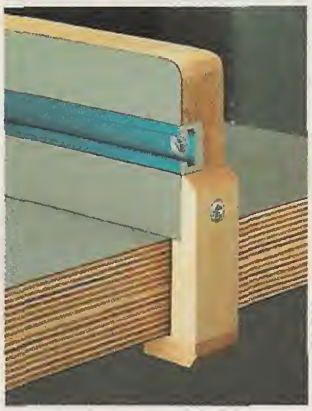
The pivot block consists of two pieces — a mounting block, and a pivot block shaped to a point. The *mounting block (L)* is identical to the stop block. After shaping the edge of the *pivot block (M)*, you can glue it to the mounting block.

With the accessories complete and the table and fence in place, you're ready to make just about any cut on the band saw — with precision and ease.

Fence Highlights

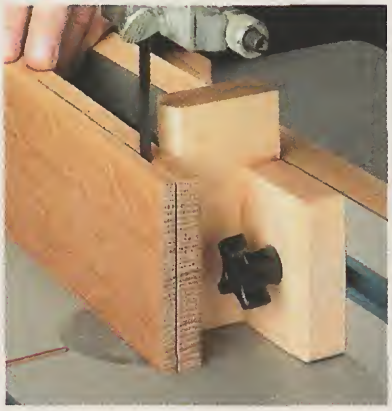


◄ *Stopped Cuts. Making stopped cuts is a snap with a simple stop block that fits into the T-track in the fence.*



▲ *Blade Drift. Adjusting the fence to match the drift of the blade is just a matter of "tweaking" the set screws in the fence.*

◄ *Hold-Down. A small hold-down at the end of the fence prevents it from lifting off the surface of the table.*



◄ *Resawing. The adjustable pivot block allows you to resaw thick stock into thinner stock with precision.*

How to Get More out of Your Bench Grinder

Get better results from your grinder — all it takes are a few after-market upgrades.

▲ *What's in a Name? An aluminum oxide, 80-grit stone, with a soft bond (J) is the best choice for grinding and sharpening in the shop.*

I used to consider a bench grinder a "rough" tool. I'd use it to sharpen my mower blade, clean up the ends of cut-off bolts, and occasionally grind the nick out of the edge of a chisel.

But with six after-market accessories, you can add versatility and accuracy to your bench grinder and use it for a whole range of tasks — with better, more precise results.

What a Grinder Is – In its most basic form, a bench grinder is nothing more than a double-shafted motor that spins a pair of grinding wheels at a fairly high speed (1750 - 3450 RPM). And that's part of the problem. Trying to do accurate work by hand on something rotating that fast is just about impossible. Along with the hard wheels and fixed tool rests provided with most grinders, getting an accurate result is mostly wishful thinking.

Make a Few Changes – To combat this problem and make your grinder more user friendly, all you need to do is make a few changes. One simple change that's easy to make is to replace the hard, gray wheels on your grinder with one like you see in the photo and inset above.

The wheel shown is made from aluminum oxide with a soft bond.

▲ *Dress for Success. Removing embedded metal from the stone and truing it up with a diamond dresser ensures peak performance.*

The particles break away more easily to expose new material. This means you're less likely to glaze, or clog up, the wheel and overheat a chisel or plane iron.

Caring for the Wheel – Using a softer wheel does have a downside — it's easy to wear a groove or round over the edge of the stone during use. To square up the wheel and remove any unevenness, you'll need a wheel dresser.

The wheel dresser I like to use is shown in the photo above. It's a truing tool with diamonds embedded in its 1"-wide face. To use it, you simply press the face of the tool into the stone to knock off any high spots, remove any grooves, and square the wheel across its width.

New Tool Rest – Once you have a good grinding wheel in place, the next big improvement you can make is to add a new tool rest. The problem with the tool rests that come with most bench grinders is that they mount in a fixed position. This makes it hard to accurately match and grind the correct bevel on a chisel or plane iron.

Now there are a couple solutions to this. You can make your own tool rest. The sharpening station on page 24 features chisel and plane iron sleds that adjust to match the bevel angle of the tool. There's also a basic tool rest that can handle just about any other grinding task.

The other option is to buy a tool rest like the *Veritas* tool rest on the opposite page. You can use it with any bench grinder and its large worksurface wraps around the wheel, providing solid support for just about anything you might want to grind. And it's easily adjustable, so you can be sure you'll be able to position the rest just the way you want it.

Chisel & Blade Holder – The *Veritas* rest also has a groove in it to accept shop-made or after-market grinding jigs. The one I like to use is the *Accu-Sharp* jig shown in the main photo. It holds chisels and plane irons perfectly square to the wheel. An added plus is that you can simply lift off the jig to check your progress and then set it back in place to pick up right where you left off.

Other Accessories – If the only thing you used your grinder for was sharpening chisels and plane irons, it would be a worthwhile investment. But there are two other accessories that will allow you to do even more — a buffing wheel and a wire wheel.

▲ *Other Options. A bench grinder can do more than just remove metal. Adding a shine to a project with a buffing wheel (top) or cleaning up tools with a wire wheel (bottom) adds to a grinder's versatility.*

Bring It to a Shine – A buffing wheel "loaded" with buffing or polishing compound is a great way to bring a beautiful shine to a wide variety of objects, like the bevel gauge blade shown in the top photo. Different buffing compounds are available depending on your needs. Note: Always buff *away* from the workpiece to avoid a catch.

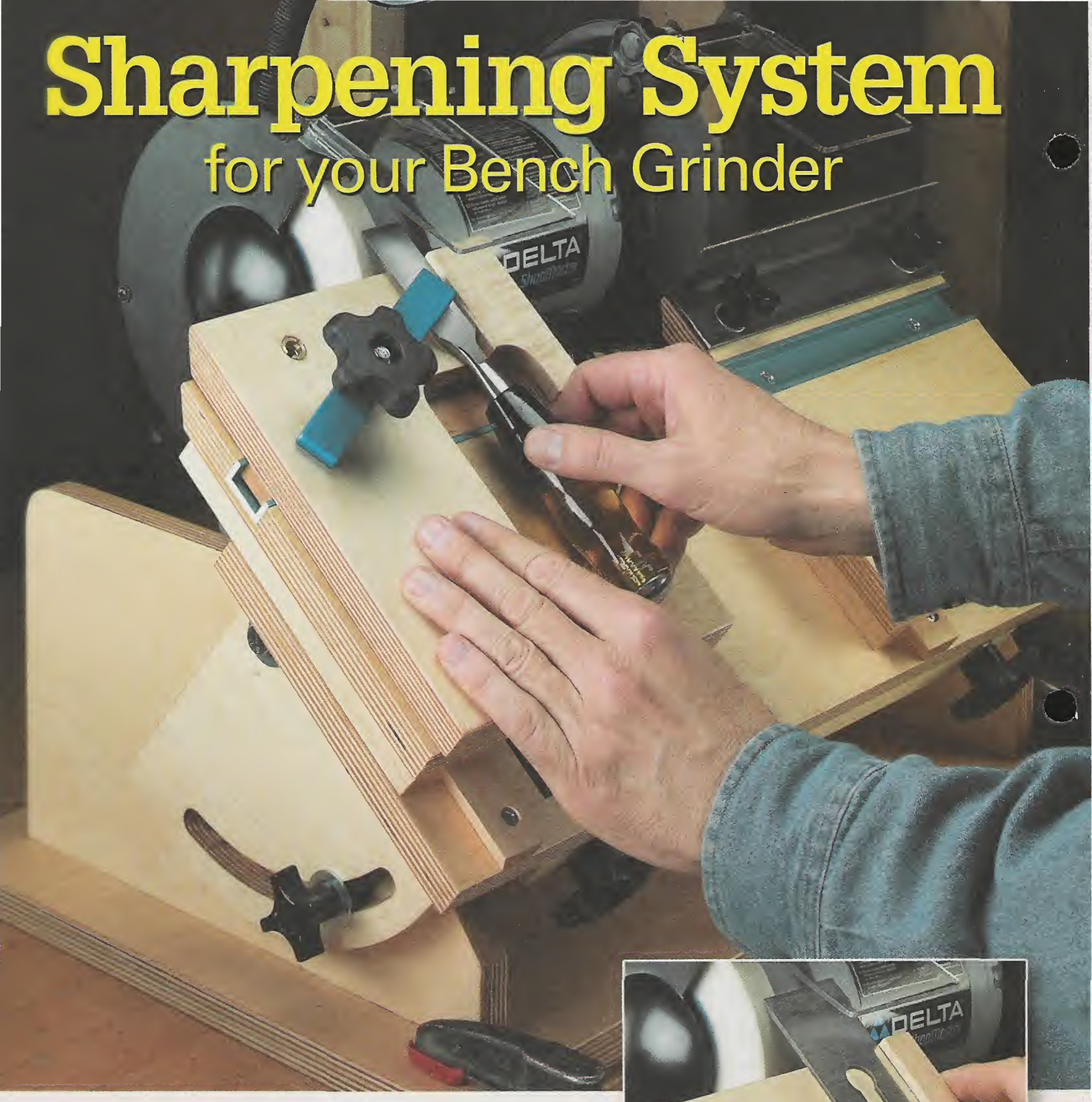
"Brush" It Away – The other accessory I use quite often is an inexpensive wire wheel. As you can see in the photo above, the stiff bristles on a wire wheel make quick work of "brushing" away rust and residue.

Six accessories. That's all it takes to add versatility and accuracy to your bench grinder. It's turned my bench grinder into a workhorse I use more often in my shop.

Top 10 Tips for Grinding Safely

1. *Always operate a bench grinder with the guards in place and properly adjusted.*
2. *Be sure grinding wheel is rated to match the speed of the grinder.*
3. *Inspect grinding wheel prior to installing on the grinder.*
4. *Never grind on a cold grinding wheel. Allow one minute of warmup.*
5. *Dress the face of the grinding wheel prior to each use.*
6. *Only grind on the face of the grinding wheel, never the side.*
7. *Always wear eye, ear, and dust protection when grinding for any extended periods.*
8. *Stand to the side when starting up the grinder.*
9. *Don't overtighten the grinding wheel. Make sure blotter (paper label) is present and flanges contact only the blotter.*
10. *Discard wheel once diameter approaches that of flanges, when the tool rest can no longer be adjusted to match wheel diameter, and when wheel no longer cuts efficiently due to rim speed.*

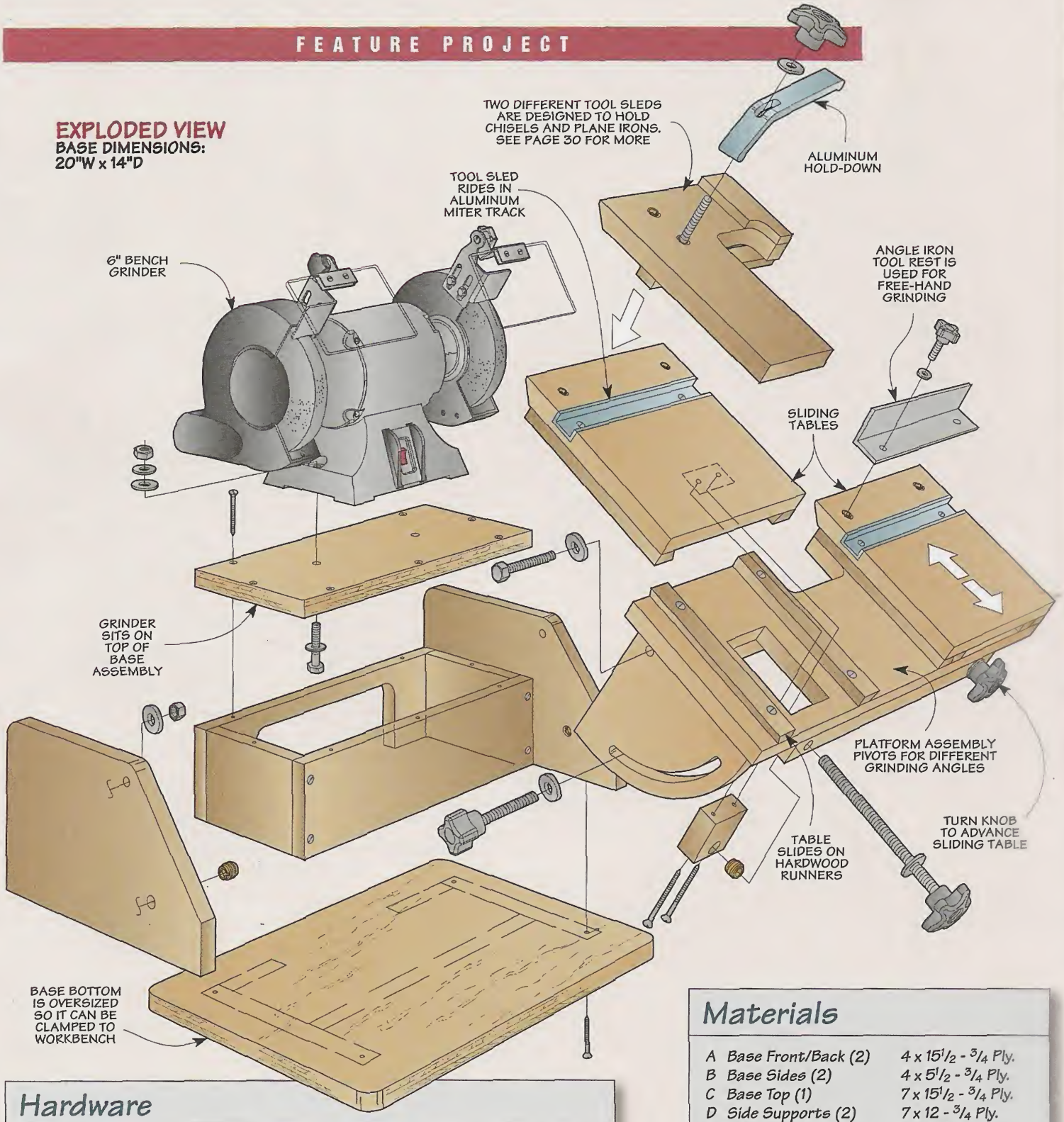
Sharpening System
for your Bench Grinder



Grinders are great for removing a lot of metal from the edge of a tool quickly. The problem with most grinders, however, is that they don't have any means of holding the tool at a consistent angle while grinding. This makes it almost impossible to grind a straight bevel on a tool. But the station shown here allows you to turn an ordinary bench grinder into a precision tool sharpening system. It features a pivoting tool rest and a pair of tool sleds that allow you to grind a perfect edge on your chisels and plane irons (see inset photo) every time.

EXPLODED VIEW

BASE DIMENSIONS:
20"W x 14"D



Hardware

- (23) #8 x 1 3/4" Fh Woodscrews
- (4) #6 x 1/2" Fh Woodscrews
- (16) #6 x 1" Fh Woodscrews
- (6) #8 x 1 1/2" Fh Woodscrews
- (4) #8 x 2 1/2" Fh Woodscrews
- (1) 1 1/2" x 1 1/2" x 8" Angle Iron
- (4) 5/16"-18 Threaded Brass Inserts
- (9) 3/8"-16 Threaded Brass Inserts
- (2) 3/8" Threaded Rods, 6 1/4" long
- (10) 3/8" Washers
- (2) 5/16" Washers
- (2) 3/8" x 2" Hex Head Bolts
- (2) 3/8" x 1 1/2" Studded Knobs
- (2) 3/8" Star Knobs
- (2) 5/16" x 1" Studded Knobs
- (4) 3/8" Nylon Lock Nuts
- (2) Miter Track (8" long)
- (2) Aluminum Hold-Down Kits

Also needed: Mounting Hardware for Grinder

Materials

A	Base Front/Back (2)	4 x 15 1/2 - 3/4 Ply.
B	Base Sides (2)	4 x 5 1/2 - 3/4 Ply.
C	Base Top (1)	7 x 15 1/2 - 3/4 Ply.
D	Side Supports (2)	7 x 12 - 3/4 Ply.
E	Base Bottom (1)	14 x 20 - 3/4 Ply.
F	Pivoting Platform (1)	7 x 20 - 3/4 Ply.
G	Platform Wings (2)	6 x 6 - 3/4 Ply.
H	Sliding Tables (2)	7 3/4 x 8 - 3/4 Ply.
I	Runners (8)	1/2 x 1 - 7
J	Adjustment Blocks (2)	3/4 x 2 1/4 - 2 1/4
K	Guide Rails (2)	3/4 x 1 - 14 1/4
L	Tool Sleds (2)	7 1/4 x 8 1/2 - 3/4 Ply.
M	Sled Runners (2)	3/8 x 3/4 - 7 1/4
N	Chisel Fence (1)	3/8 x 1 1/2 - 3 1/2
O	Plane Iron Fence (1)	3/8 x 3/4 - 8 1/2

Base and Pivoting Platform

The sharpening system is made up of three main assemblies — a base to support the grinder, a pivoting platform, and a pair of sliding tables. I started by building the base.

Base – At first glance, the base looks a little bit like a scaled-down bread box (Figure 1). But instead of holding bread, this box is for the grinder. And instead of fitting inside the box, the grinder sits on top.

As you can see in Figure 2, there's not much to the base. It's essentially just a plywood box sandwiched between two side panels. The oversized base bottom allows you to clamp the grinding station down to the top of your workbench.

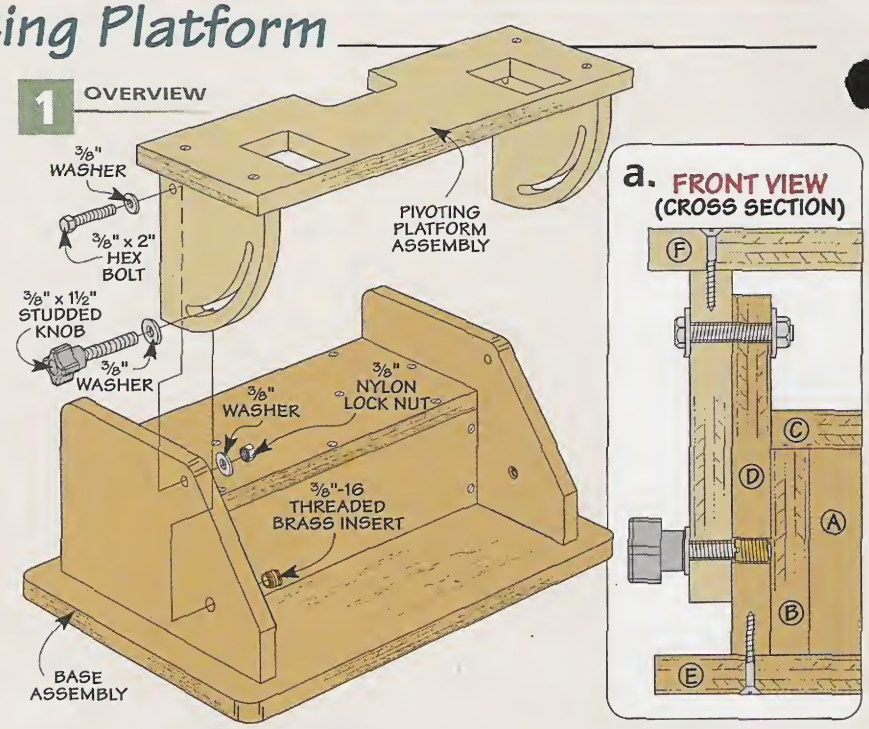
To make the base, start by cutting out the base front, back, sides, and top from ¾" plywood. Depending on your grinder, you may have to alter the dimensions of some of these pieces so that your grinder sits at the proper height. The end view in Figure 2 shows how to determine these measurements.

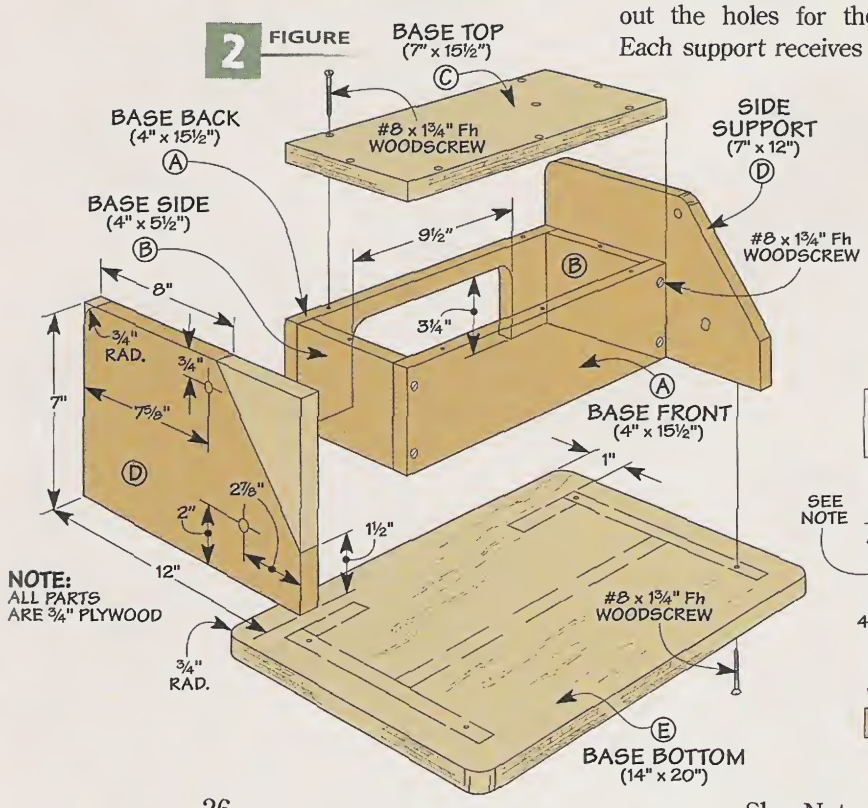
To make it easier to attach and remove the grinder from the station, there is an opening in the base back, as shown in Figure 2. After making this opening, you can glue and screw the pieces together.

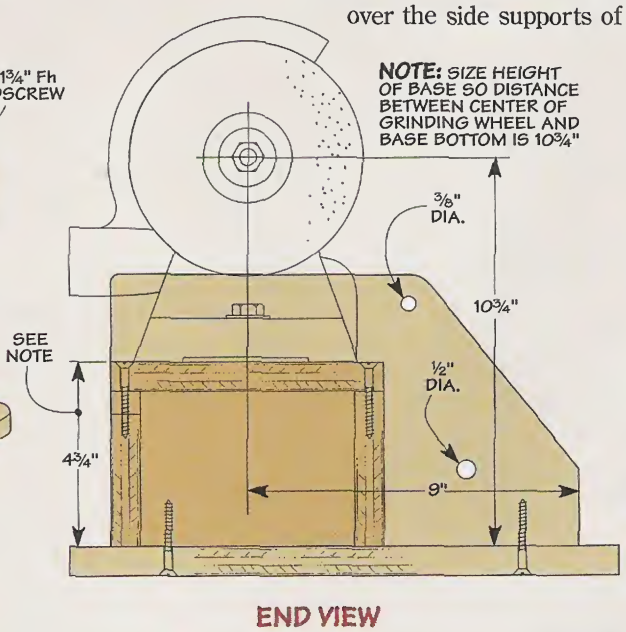
Side Supports – A pair of side supports are attached to the ends of the box. These provide a means of mounting the pivoting platform that will be added later. After cutting the side supports to shape, you can lay out the holes for the hardware. Each support receives a pivot hole near the top edge as well as a hole near the bottom edge for a threaded brass insert. With the inserts installed, the side supports can be glued to the ends of the box flush with the back and bottom edges.

To complete the base, all you have to do is cut a base bottom out of a piece of ¾" plywood. Then screw the bottom to the side supports.

Pivoting Platform – With the base complete, you can start on the pivoting platform. As you can see in Figure 1a, this platform fits over the side supports of







the base and pivots on a couple of bolts. A pair of knobs is used to lock the platform in place so you can grind your tools at any angle from about 25° to 90°.

The platform is cut from a piece of ¾" plywood, as shown in Figure 3. You'll need to create a couple of openings in the platform for some adjustment blocks that are added later. I did this by drilling holes in the corners of the openings and then cutting out the waste with a jig saw.

I used the same technique to cut a notch at the back edge of the platform. The purpose of this notch is simply to provide easy access to the on/off switch on the grinder.

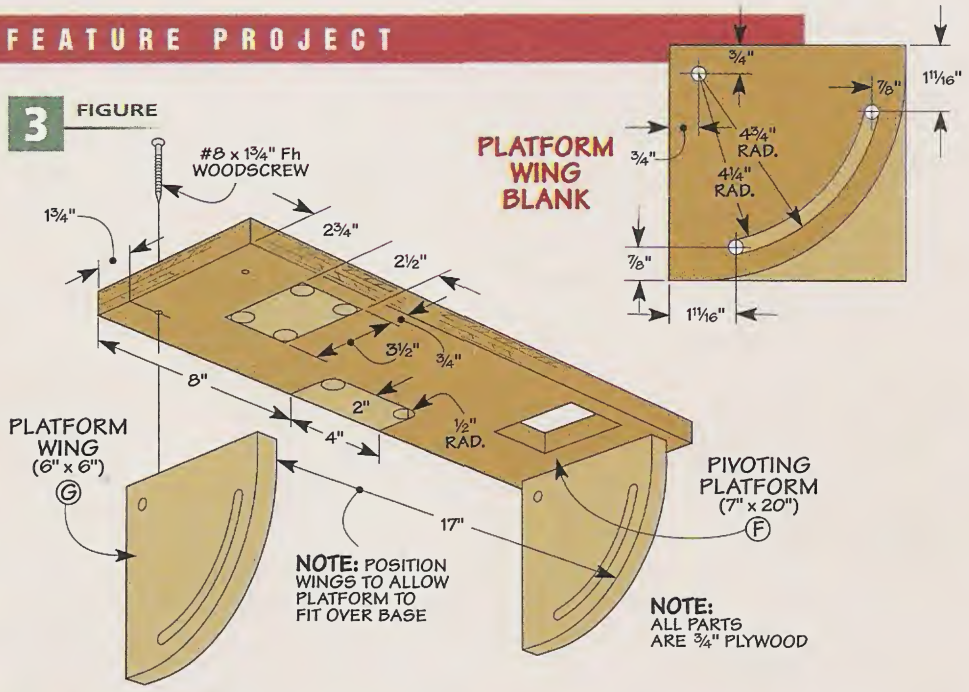
Platform Wings – The platform sits on a pair of "wings" that allow it to pivot. As you can see in Figure 3, these wings are curved along their front edges. However, they start out as two square blanks. Then you can lay out the pivot hole, slot, and wing profile on each blank, according to the dimensions shown in the detail in Figure 3.

Once you've completed the lay out, you can drill three holes in each blank. One is the pivot hole, and the other two holes are drilled at the endpoints of the slot.

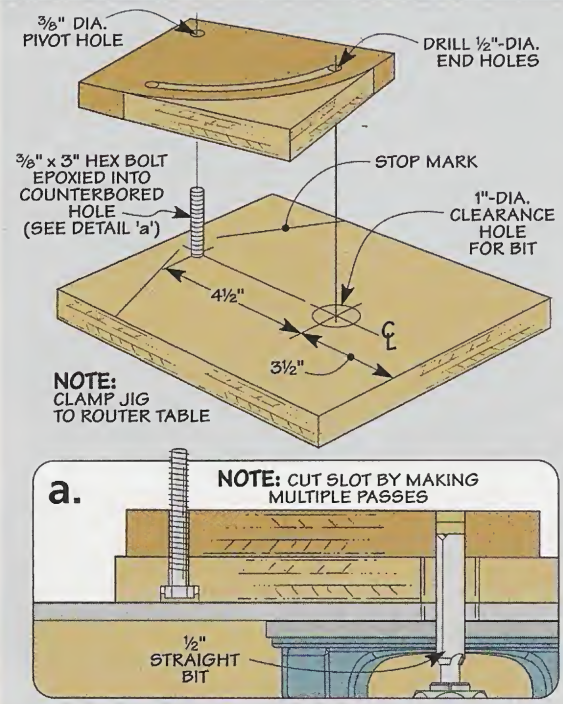
To create the curved slot, I made a simple jig to use with the router table (see box below). Then all you have to do is cut the curved profile on the front edge of each blank.

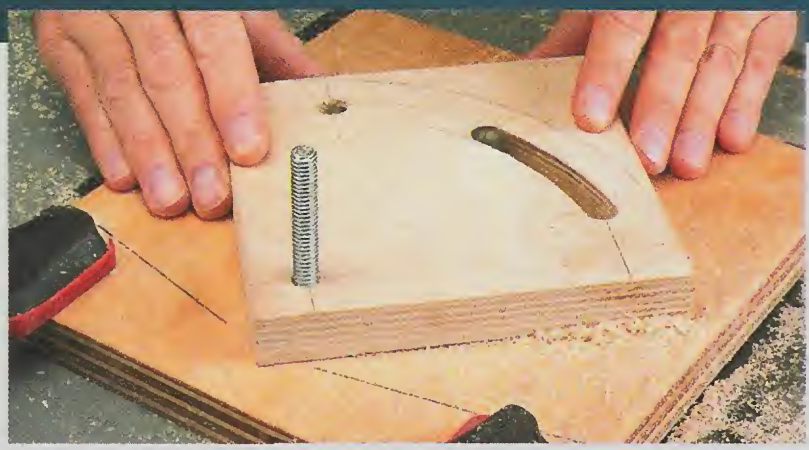
Attaching the Wings – The wings are glued and screwed to the underside of the platform so that they straddle the side supports of the base. To make it easier to position the wings on the platform, I attached the wings to the side supports with some bolts, washers, and lock nuts (Figure 1a). (Leave the nuts just loose enough so that the wings can pivot.) With the wings locked in place by the knobs, you can simply clamp the platform in position and screw it to the wings.

FIGURE 3



Routing Curved Slots





Routing the curved slots in the platform wings is a simple procedure with this jig. It's nothing more than a piece of plywood with a hex bolt epoxied into a counterbored hole, see drawing at left.

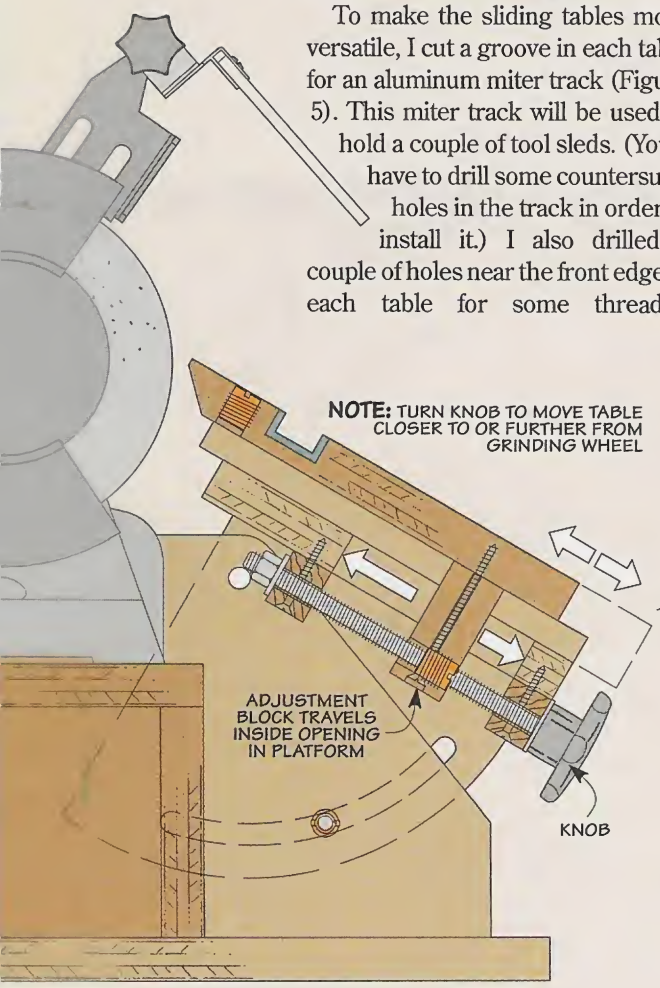
To use the jig, slip the pivot hole of the wing blank over the hex bolt. Then clamp the jig to the router table so the router bit extends up through one of the two end holes of the slot. Raise or lower the router bit to take a ¼"-deep cut. Now turn the router on and pivot the blank until you reach the hole at the opposite end. Complete the slot by making additional passes, raising the bit slightly between each pass.

Sliding Tables

With the base and platform of the sharpening system complete, you can begin making the sliding tables. As you can see in Figure 4, the construction of the tables is pretty straightforward. Each table is just a piece of plywood that slides on a set of dovetail ways. A knob allows you to advance the table toward the grinding wheel, so you can control how much material you're grinding off the edge of your tool. As with any project that has moving parts, the trick is in getting all the pieces to fit together just right. But I'll talk more about that later.

Tables – Each table starts out as nothing more than a piece of ¾" plywood. A bevel is ripped along the front edge of each table to create clearance for the grinding wheel when the table is moved up close to the grinder, see drawing below.

To make the sliding tables more versatile, I cut a groove in each table for an aluminum miter track (Figure 5). This miter track will be used to hold a couple of tool sleds. (You'll have to drill some countersunk holes in the track in order to install it.) I also drilled a couple of holes near the front edge of each table for some threaded inserts. These will be used for attaching a removable tool rest.

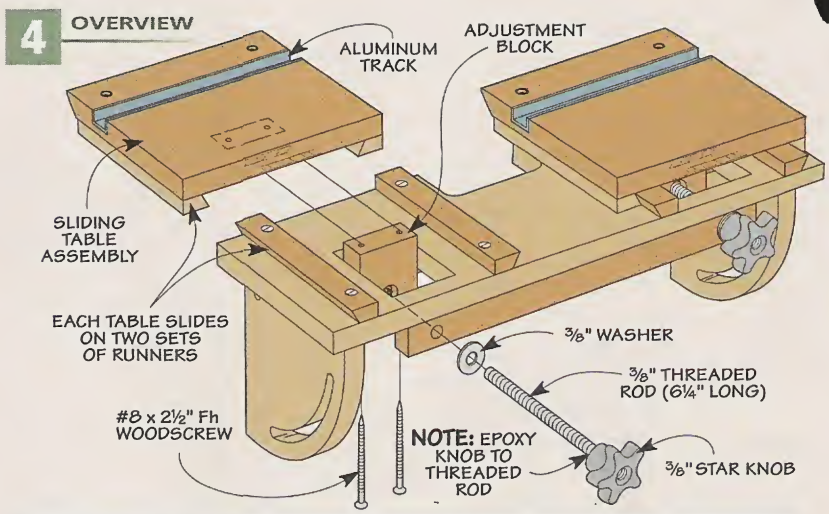


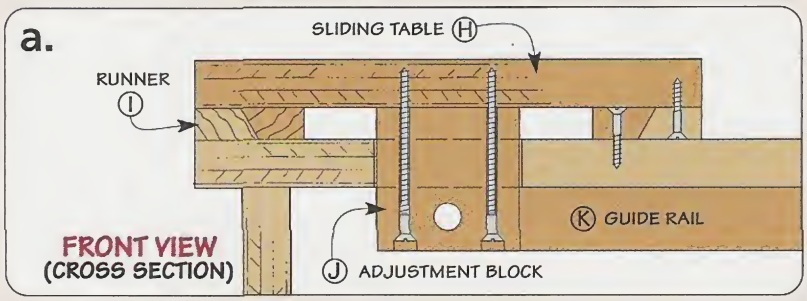
Runners – Once the miter track and threaded inserts are installed, you can make the runners that allow the tables to slide back and forth. To do this, I started by ripping a 30° bevel along the edge of a single hardwood blank. Then I crosscut the individual runners to length (Figure 6).

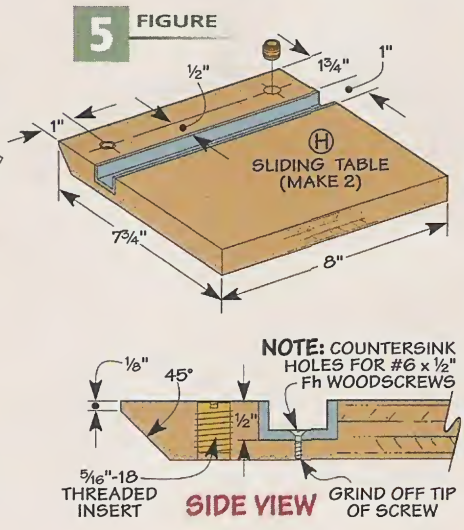
After drilling some countersunk screwholes, you can attach the runners to the bottom of the table and the top of the pivoting platform. This is a two-step process. First, screw the runners to the underside of the table so that they are flush with the edges, as shown in Figure 6a.

To position the mating pair of runners on the pivoting platform, I put a strip of carpet tape on one side of each runner and set them in place against the runners that were already installed on the sliding table. Then I carefully set the pivoting platform down on the sliding table, pressing it down firmly to make sure the tape adhered (Figure 6). After sliding the table off the platform, you can drill pilot holes for the mounting screws and then screw the runners in place to the pivoting platform, just as you see in Figure 7.

Adjustment Blocks – At this point, both tables should slide smoothly along the runners. But you still need a way to control the movement. The answer here is fairly simple. An adjustment block with a







threaded insert is attached to the underside of each table. Passing through this block is a threaded rod with a star knob epoxied on the end. As you turn the knob, the threaded rod moves the adjustment block (and the table).

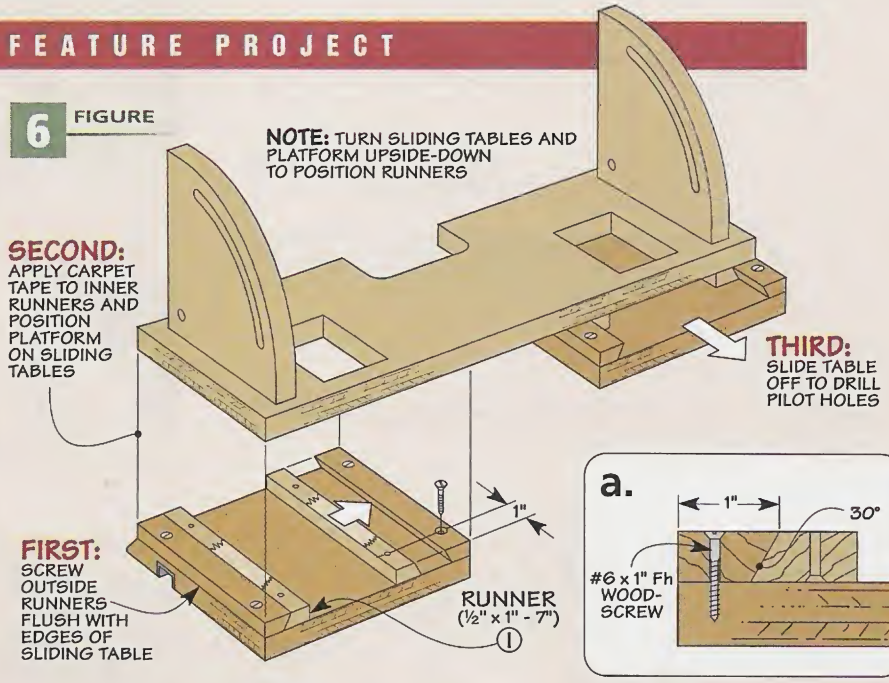
Guide Rails – Before you can install the adjustment blocks and threaded rods, however, you need to add a couple of guide rails to the underside of the pivoting platform (Figure 8). The purpose of these rails is to simply guide and support the threaded rods.

Each guide rail is nothing more than a strip of hardwood with a couple of holes for the threaded rods. You can screw the guide rails to the bottom of the pivoting platform so they are flush with the edges of the openings that you made in the platform earlier.

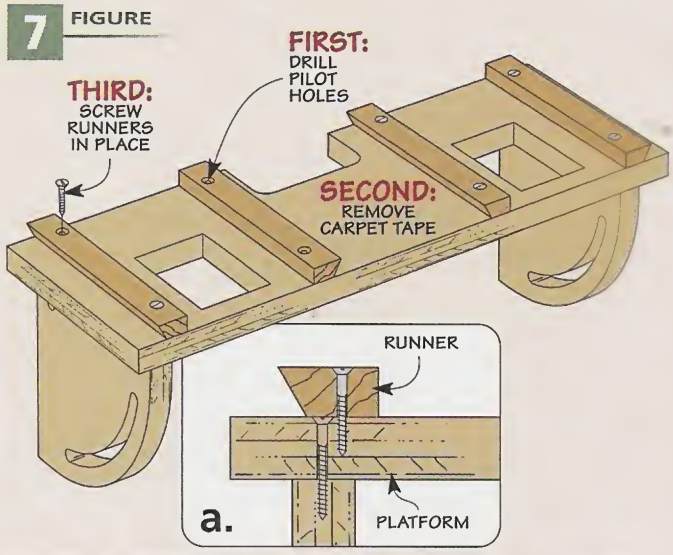
Adjustment Blocks – As you can see in Figure 8, each adjustment block is just a piece of hardwood with a threaded insert installed. To attach the blocks to the sliding tables, start by slipping the tables over the runners on the pivoting platform and turning the whole assembly upside-down. Now slide the tables out so that the back edge (the one without the bevel) is 1" beyond the edge of the platform. Take a close look at Figure 8 to make sure that you have all the pieces oriented in the correct position. Set the adjustment blocks in the openings in the platform so they are butted up against the back guide rail. Now you can screw the blocks to the tables.

Hardware – With the adjustment blocks screwed in place, you can add the threaded rod and knob assemblies. Finally, to prevent the threaded rods from backing out of the adjustment blocks, add a washer and a nylon lock nut to the end of each threaded rod (Figure 8). Once this is done, you can reattach the pivoting platform assembly on the base of the station.

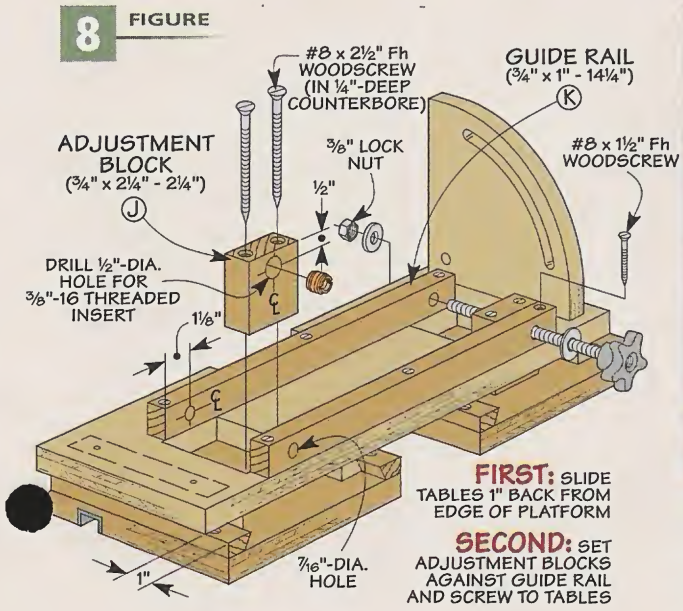
6 FIGURE



7 FIGURE



8 FIGURE



▲ *Pivot. To adjust the angle of the pivoting platform, loosen the two star knobs on the sides of the wings and swing the platform into position.*

▲ *Slide. To move the sliding table closer to (or further away from) the grinding wheel, turn the knob along the front of the pivoting platform.*

Shop-Made Accessories for Grinding Perfect Bevels

Chisel Sled

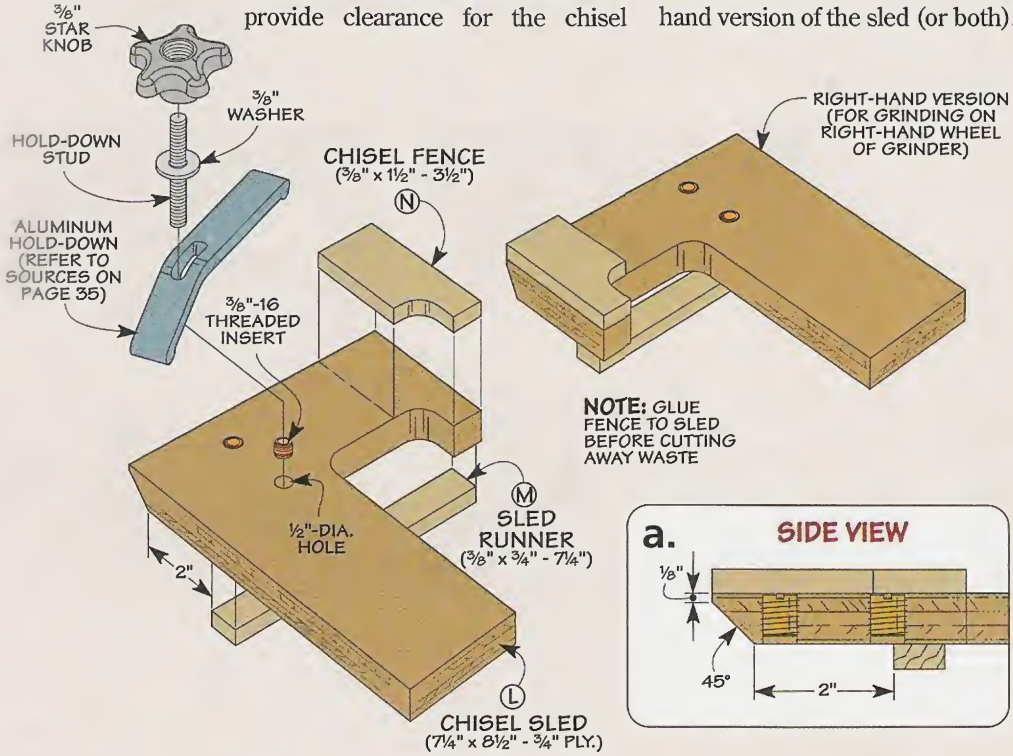
■ To get the most out of the sharpening system, you need a way to hold the tool in a fixed position as you grind across the edge. To do this, I made a couple of different styles of tool sleds — one for chisels and one for plane irons.

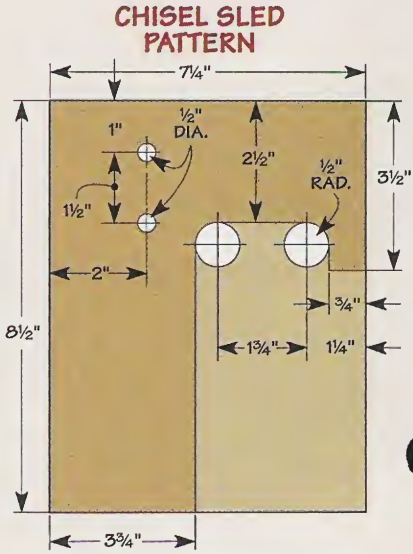
The sleds slide back and forth in the aluminum miter tracks, allowing you to grind a perfectly straight edge on just about any tool. And since both sleds simply drop in place, you can lift them out at any time and turn them over to check on your progress (see lower photo at right).

The chisel sled is just a piece of plywood with a J-shaped cutout to provide clearance for the chisel handle. The front edge of the sled is beveled (like the sliding tables) to provide clearance for the grinding wheel. A fence glued to one side of the sled holds the chisel square to the grinding wheel. And a runner on the bottom of the sled is sized to fit the miter track in the table, allowing the sled to slide back and forth. Finally, an aluminum hold-down is used to secure the chisel to the sled.

Depending on which side of the grinder you prefer to work, you may want to build a left-hand or right-hand version of the sled (or both).

▲ *Check Your Progress. You can check your grinding progress by simply turning the tool sled over.*

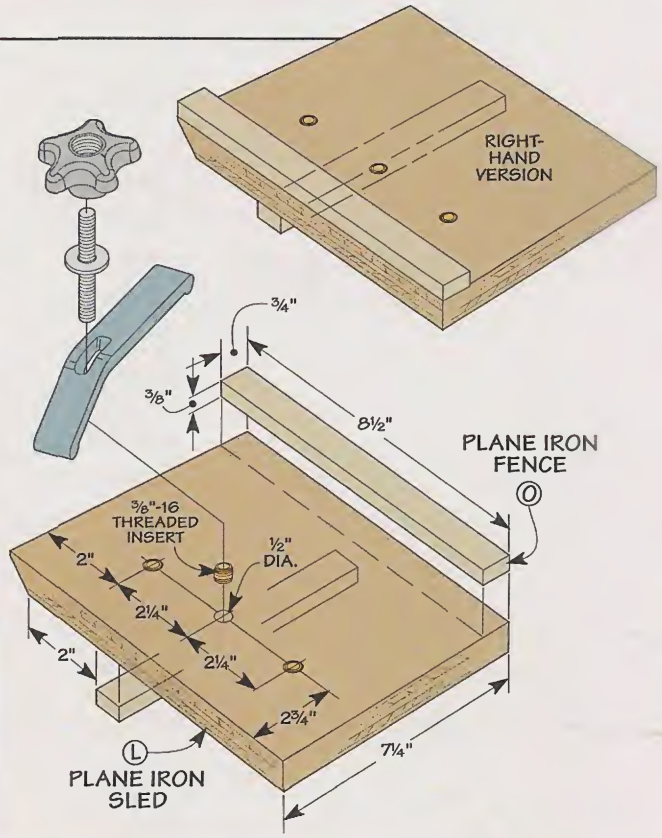




Plane Iron Sled

■ In order to grind plane irons, I made a slightly different type of sled. Since you don't have to worry about handles getting in the way when you're grinding plane irons, this sled is just a rectangular piece of plywood with a fence to hold the blade square to the wheel (see drawing).

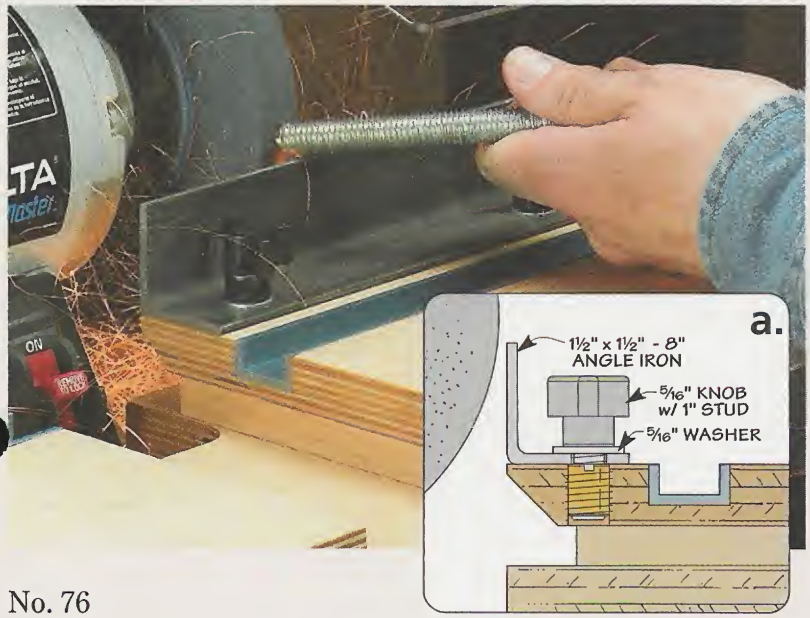
Like the chisel sled, this sled has threaded inserts for the aluminum hold-down to accommodate different widths of plane irons. And again, you may want to build a left-hand version or a right-hand version of the sled depending upon which side of the grinder you'll be using.



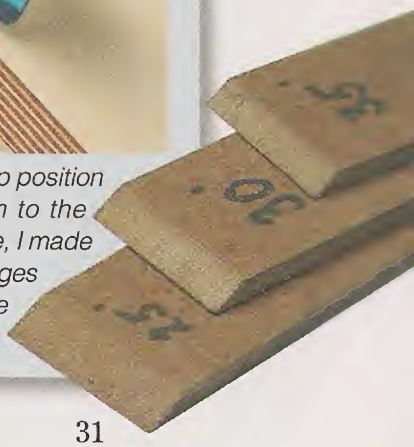
Tool Rest

■ When it comes to free-hand grinding, you don't need to hold the workpiece in a fixed position. But it's helpful (and safer) to have a tool rest to prevent the grinding wheel from pulling the tool out of your hands.

You can make a simple tool rest out of a piece of angle iron. Just drill a couple holes in the angle iron and use a pair of threaded knobs to attach it to the inserts mounted in the top of the sliding table.



Set-Up Gauges



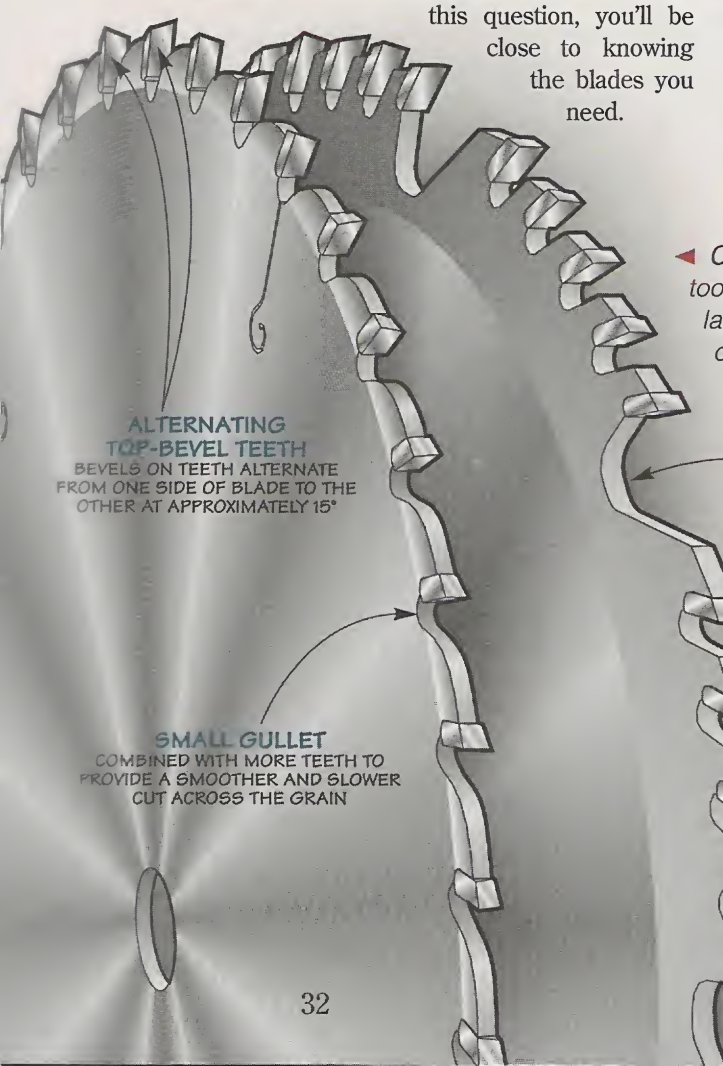
▲ *Bevel Angle. To help position the pivoting platform to the desired grinding angle, I made a set of hardboard gauges for some of the more common bevel angles.*

2 Must-Have Table Saw Blades

Whenever I walk into a woodworking or home improvement store I always see a wall full of saw blades. It's amazing how many there are to choose from. Do you really need all of those blades? The answer to that question is not as hard as you might think. The key is to simplify the whole process.

Once you break through the blizzard of terms and information available, you'll find that the choice really boils down to answering one important question. What kind of cutting do I do most? When you answer this question, you'll be close to knowing the blades you need.

▼ *General-Purpose Blade (ATB). Teeth with alternating top bevels. Good for rips and crosscuts in all materials.*



◀ *Combination Blade (ATBR). A raker tooth and ATB teeth separated by a large gullet. Good for making both crosscut and rip cuts.*

FIRST BLADE

If you're like me, most of your work on the table saw involves crosscutting and ripping of both hardwoods and sheet goods. So it's important to me to have a blade that can handle a wide range of tasks without having to make blade changes.

One blade that does this is the combination blade. As the name implies, this blade design attempts to find common ground between a rip blade and a crosscut blade.

It does this by arranging the teeth in sets of five. You'll usually see four alternating top-bevel teeth and a raker tooth (see drawing at left). This means the teeth are arranged so that the tops of the teeth are beveled about 15° and the bevels alternate from one side of the blade to the other (see the box on the opposite page).

The top-bevel teeth score the wood fibers as they cut, giving you a clean crosscut. Then the flat-topped raker tooth cleans out the material that is left behind.

The five sets of teeth are separated by a large gullet that allows the sawdust to be cleared from the cut when ripping is being done. The combination of the large gullet and this tooth profile makes short work of both rip cuts and crosscuts.

Another good option for a "first" blade choice is a general-purpose blade. Just like combination blades, general-purpose blades are designed to both rip and crosscut — but they go about it in a slightly different

manner. You'll find these blades usually have between 40-60 teeth with an alternating top-bevel (ATB) tooth profile similar to the middle blade in the box below.

This tooth configuration makes a very clean shearing cut across the grain as well as with the grain. They also cut at a reasonable speed and do a respectable job of cutting plywood and laminates.

If I had only one blade to buy, it would be either a combination blade or a general-purpose blade. My general-purpose blade stays on my table saw about 90% of the time and meets most of my cutting needs.

Both the general-purpose blade and the combination blade are a bit of a compromise, especially when it comes to ripping. That's why you need to consider adding a second saw blade to your shop.

SECOND BLADE

My second purchase would be a rip blade. This is your best choice whenever you have a lot of ripping to do.

If you look at the drawing at the right, you'll notice that a typical rip blade has only flat-topped teeth. The number of teeth are fewer than you will find on either the general-purpose or combination blades.

The flat-top teeth are more effective at ripping than the bevel teeth that cut only on one side of the blade at a time. The teeth on the rip blade have a high "hook angle." That means they lean farther forward, which allows them to cut quickly and smoothly through the stock.

These flat-top teeth will give you another added benefit. They'll make flat-bottom cuts that can't be made with the combination blade or general-purpose blade. This is really nice when when your project calls for either flat-bottom grooves or stub-tenon joints.

Other Options – As you shop for blades, you may run across a few other things you need to consider. These aren't things that are terribly difficult to evaluate but it's still good to know about them.

One thing you'll notice is that a number of saw blades come with special finishes or coatings. These coatings or finishes are designed to make the blade pass through the stock more easily. Many blades have this option, but I wouldn't buy a blade based on its coating alone.

Another choice you'll have to make is whether you want a thin-kerf or regular-kerf design. This refers to the blade thickness. A regular-kerf blade is $\frac{1}{8}$" wide while the thin-kerf blade is $\frac{3}{32}$" in width.

The thin-kerf blade requires less effort from the saw motor when the saw is cutting. So, if you own a benchtop table saw, or if your table saw has a low horsepower rating, you might want to consider getting this type of blade.

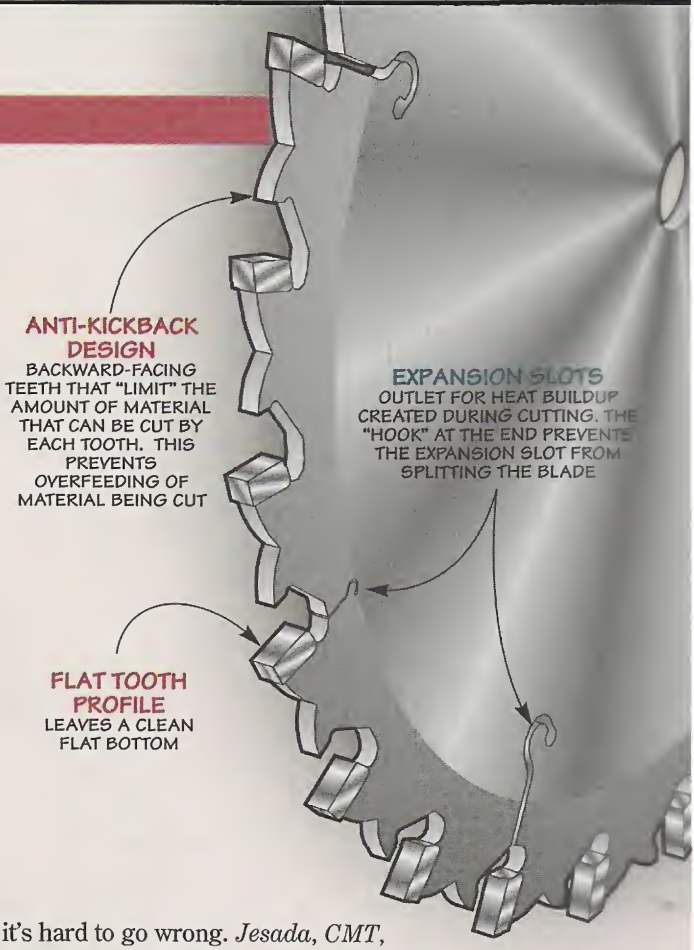
Some woodworkers prefer the thin-kerf blade even on table saws that have more horsepower. They feel it cuts faster and takes less effort to feed the workpiece through than with regular-kerf blades.

Recommendations – Even armed with all this information, you still might be wondering which specific blades to buy. Fortunately, there are several quality blade manufacturers today, making it pretty easy to find a good blade. The decision really comes down to personal preference (as well as your budget).

When choosing a ripping blade, it's hard to go wrong. *Jesada*, *CMT*, *SystiMatic*, *Freud*, and *Amana* (just to name a few) all make good-quality rip blades.

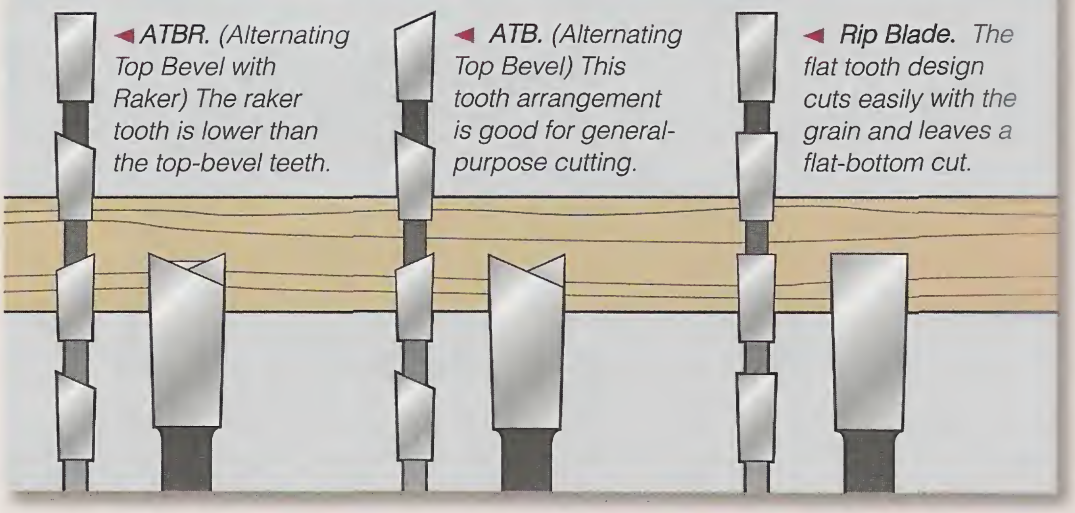
When it comes to selecting an all-around, general-purpose blade, I'm a little more choosy. I really like the *Forrest Woodworker II*. But for a little less money, the *Freud LU84* combination blade is a great choice.

For me, having only two saw blades means less time spent changing blades and more time in the shop building projects.



▲ *Rip Blade. Has greater hook angle, fewer teeth, and large gullet to remove more stock with each pass.*

Tooth Cut Profiles



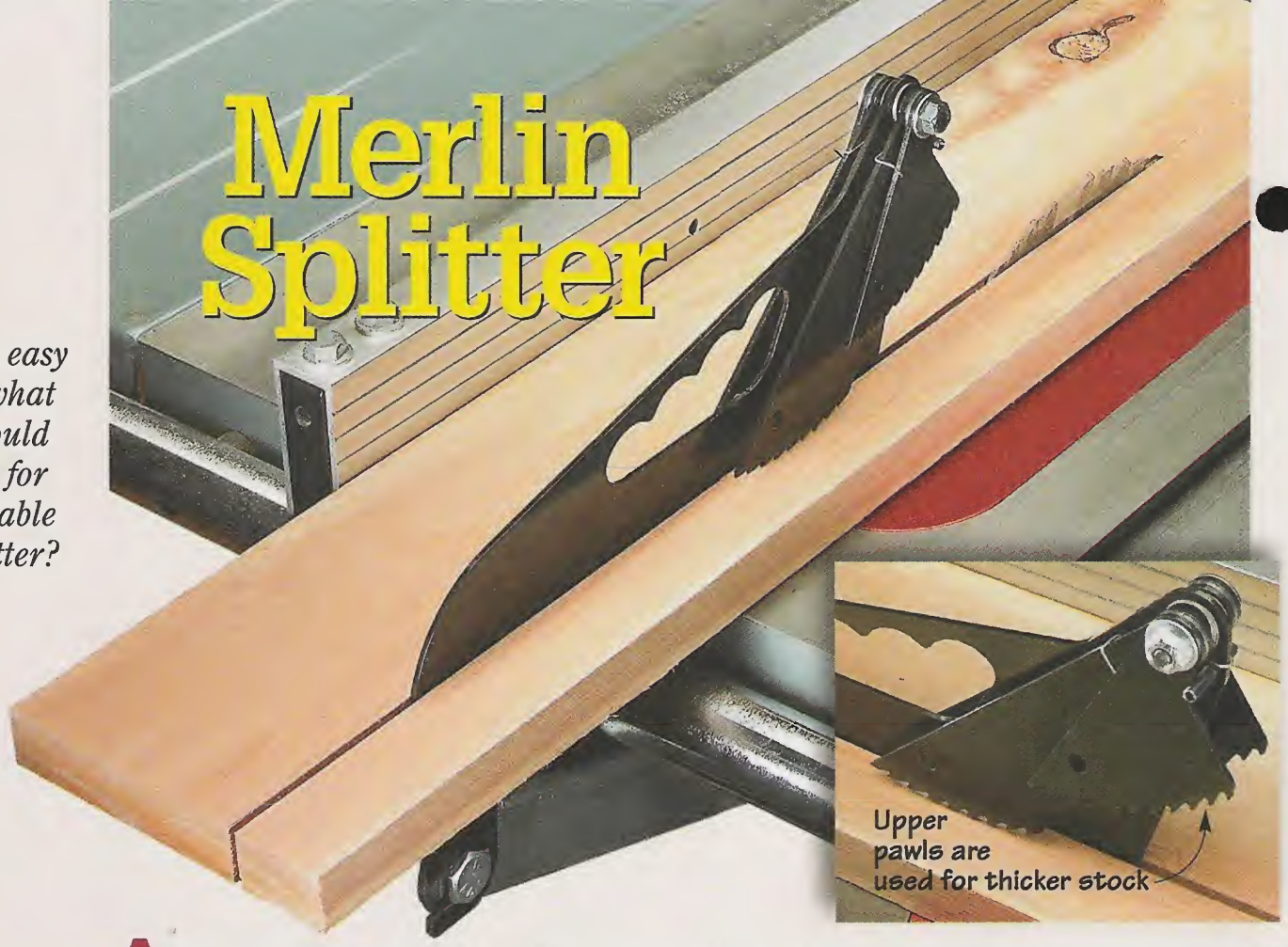
◀ *ATBR. (Alternating Top Bevel with Raker) The raker tooth is lower than the top-bevel teeth.*

◀ *ATB. (Alternating Top Bevel) This tooth arrangement is good for general-purpose cutting.*

◀ *Rip Blade. The flat tooth design cuts easily with the grain and leaves a flat-bottom cut.*

Merlin Splitter

Safe and easy to use, what more could you ask for from a table saw splitter?



A table saw splitter serves an important purpose — it prevents the kerf in a workpiece from closing and pinching against the blade. And the pawls prevent the workpiece from kicking back — but only if you use the splitter.

A couple of the most common excuses I hear for not using a splitter are "It's just not convenient," or "It's such a hassle." And granted, removing and then having to reinstall the assembly after making a non-through cut, like a dado, rabbet, or groove can be a pain.

That's where the *Merlin* splitter shown above comes in. It eliminates the problems and the excuses — you can remove and reinstall the *Merlin* splitter in just seconds.

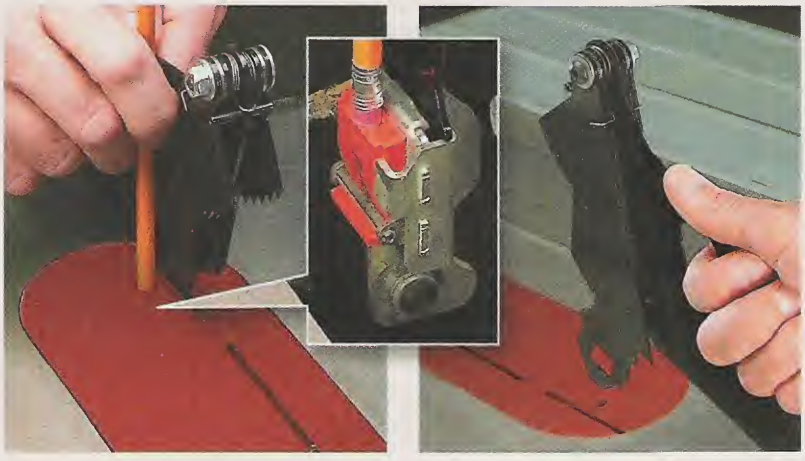
Ease of Use – The photos below give you an idea of how the mechanism works. The secret is the quick-release button installed inside the saw. All you have to do is press it down, pivot the splitter toward the back, and slip it right off.

As you can see below, I drilled a hole in my insert plate so I could easily access the button with a pencil without having to remove the insert (see inset). Reinstalling the splitter is even easier. Just hook it on the rear mount and snap it in place instantly.

Installation – The only real challenge you'll have with the *Merlin* splitter is installing it. You'll need to remove the mounting parts for your splitter and blade guard so you can install the hardware for the *Merlin* splitter. And since saws vary, you need to be sure to order the correct model for your table saw. *Excalibur* carries a *Merlin* splitter to fit almost a dozen contractor and cabinet saw models. For sources, check out the margin on the opposite page.

Cost – The $115 cost of the *Merlin* splitter might give you second thoughts about buying one. But it's really a small price to pay to ensure your safety with every cut. Note: The *Merlin* isn't a substitute for a blade guard. For added safety, it's best to supplement the splitter with an after-market overarm blade guard.

From now on, I'll use a splitter whenever I can. With the convenience of the *Merlin* splitter, it doesn't make sense not to.



► *Using the Splitter. Removing the Merlin splitter takes seconds. Simply slip a pencil through your insert to release the splitter (inset) and then "pop" it off (right). Reinstalling the splitter is just as fast.*

Sources

Router Dado Jig

■ The results you get with the router dado jig on page 6 makes it a "must-have" accessory for the shop. The best thing is that building the dado jig won't require a lot in time, materials, or hardware.

Most of the hardware, like the threaded rod, bolts, screws, washers, and other items, are available at a local hardware store or home center. The only items you may have trouble locating are the two different knobs used.

Both types of knobs we used on the dado jig are available from *Rockler* (see margin). The tapered knob used to clamp the jig in place is part number 81505. And the two knobs used to lock in the dado width are part number 71514.

Bench Grinder Accessories

■ Bench grinders and their accessories are common at most hardware stores and home centers. So I was able to find a wire wheel and a dresser for my bench grinder locally.

But it gets a little more difficult to find specialized items like aluminum oxide stones, buffing wheels, and adjustable tools rests.

You can find most of the other items shown in the article on page 22 by contacting the *Woodsmith Store* at the number listed in the margin. They carry stones, dressers, and tool rests along with buffing wheels and compounds.

We used an 80-grit aluminum oxide stone (2278) from *Oneway*. The *Veritas* tool rest is from *Lee Valley* (05M23.01). And the grinding jig is from *Accu-Sharp* (AS502).

The other sources listed in the margin carry some of the identical items or ones that are similar.

Band Saw Table & Fence

■ The band saw table and fence on page 16 requires a few pieces of hardware you'll need to order.

Rockler carries most of the items you'll need. The miter gauge track part number is 63018 and the T-track is 21746. The other items needed are a pair of flange bolts (83311), a five-star knob (23820), and two threaded inserts (33191).

To attach the accessories to the fence, you can order a pair of four-star knobs (1065526) from the *Woodsmith Store*.

Sharpening Station

■ Most of the hardware required to build the sharpening station on page 24 is available at a hardware store or home center.

The less common hardware came from a variety of sources. You can find the part numbers below and the contact information in the margin.

Miter Track – To provide smooth movement for the sleds, we cut the guides from some *Rockler* miter track (63018).

Hold-Down – Then to secure the chisels or plane irons to the sled, you'll also want to ask *Rockler* for a hold-down clamp with a knob and threaded rod (21912).

Knobs – In addition to the knob for the hold-down, *Rockler* also carries the two five-star knobs (23820) you'll need.

The studded knobs used in the project came from two sources. The $^5/_{16}$" knobs (1065204) are available from the *Woodsmith Store*. And *Reid Tool* has the $^3/_8$" version (DK-97).

Inserts – Finally, you'll need two different size inserts (33191, 71589). Both are from *Rockler*.

MAIL ORDER SOURCES

Similar project supplies may be ordered from the following companies:

Rockler
800-279-4441
www.rockler.com
Flange Bolts, Knobs, Miter Track, T-Nuts, T-Track, Threaded Inserts

Lee Valley
800-871-8158
www.leevalley.com
Buffing & Grinding Wheels, Dressing Tools, Grinder Tool Rest, Knobs

Oneway Manufacturing
800-565-7288
www.oneway.ca
Buffing & Grinding Wheels, Dressing Tools, Grinder Tool Rest

Parkwood Products Co.
201-391-4933
Accu-Sharp Grinding Jig

Reid Tool
800-253-0421
www.reidtool.com
Knobs

Woodcraft
800-225-1153
www.woodcraft.com
Buffing Compounds, Buffing & Grinding Wheels, Chisel Grinding Jig, Grinder Tool Rest, Knobs, T-Track

Woodsmith Store
800-835-5084
Accu-Sharp Grinding Jig, Buffing Compounds, Buffing & Grinding Wheels, Chisel & Blade Holders, Dressing Tools, Flange Bolts, Knobs, Miter Track, T-Nuts, T-Track, Threaded Inserts

SHOPNOTES PROJECT SUPPLIES

We now feature hardware from ROCKLER in many of our new project kits. To order, please use our toll-free order line, see below. It's open Monday through Friday, from 8 AM to 5 PM Central Time. Before calling, please have your VISA, MasterCard, Discover, or American Express card ready.

If you would prefer to mail in an order, please call the toll-free phone number below for more information concerning shipping charges as well as any applicable sales tax.

1-800-347-5105

ShopNotes on the web

- "Online Extras" - Plans, Patterns, & More
- Over 100 Woodworking Tips Online
- Visit Our Woodworking Shop Tours Gallery
- Project Plans You Can Download
- Catalog of Project Kits, Tools, Jigs, & Plans
- Forums for Woodworking, Tools, & Classifieds
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- Pay your bill
- Renew your subscription
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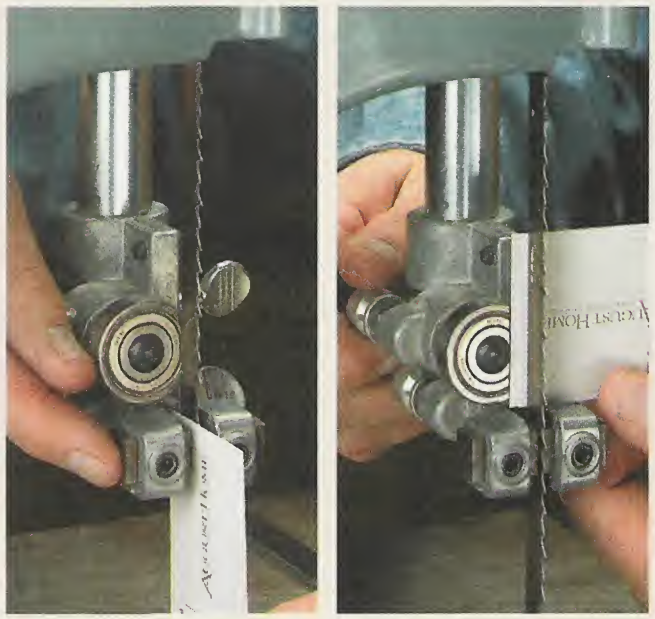
- Find out if your payment has been received

Scenes from the Shop

Soup-Up Your Band Saw. *Our new table and fence system doubles the size of your band saw table and adds an accurate, easily adjustable fence. You'll also find a couple of accessories like the resawing attachment you see here. Complete plans for the fence table and fence system begin on page 16.*

▲ ***Upgrade Your Bench Grinder.*** *Take the guess work out of sharpening your tools with this precision sharpening station, plans start on page 24.*



▲ ***Don't Settle for Sloppy Cuts.*** *We'll show you how to fine-tune your band saw so it's capable of accurately cutting anything from tenons to veneers, just turn to page 12.*